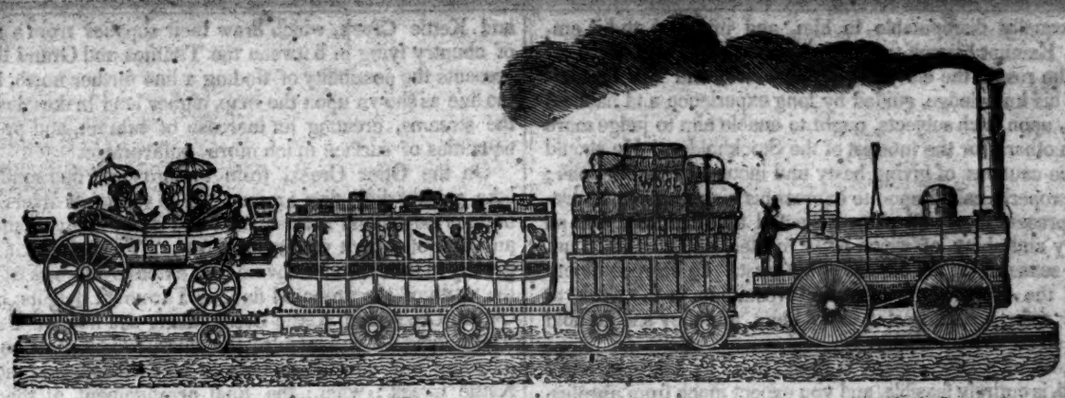

AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

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AMERICAN RAILROAD JOURNAL.

NEW-YORK, AUGUST 19, 1837.

In presenting the report of Elisha Johnson Chief Engineer on the "Niagara and Detroit Rivers" Railroad, we would remark that the portion relating to the proposed peculiarities of construction is the same as in the report recently published. Being illustrated by cuts, a better idea can be obtained than from verbal description. We make this republication accompanied by the cuts, at the request of Mr. Johnson, in consequence of the strictures of our correspondent Q.

We have also received a communication in answer to Q., and also a copy of the report for Q.

REPORT TO THE PRESIDENT AND DIRECTORS OF THE NIAGARA AND DETROIT RIVERS RAILROAD COMPANY.

GENTLEMEN,—In making a report, as your Engineer, I would first ask your attention to the ample provisions of your charter which accompanies this report. This provides for the construction of a Railroad from the town of Burtie to the town of Sandwich, with very favorable provisions in the details of the charter. By an act passed in March, 1834, a charter for a Railroad from Hamilton or Burlington Bay, to London, and from London, to the navigable waters of the River Thames, and to Lake Huron, was granted. On the last mentioned road, I had the honor to make a survey and report, voluminous in their details, with a view, on the part of the company, to amend their charter, and to present to the Government facts and reasons to induce them to aid the work.

During the progress of Parliamentary enactments, connected with that survey, I have further had the honor to be selected by you, to make a survey under the provisions of your charter; and the work has been in progress during the sittings of your Parliament. At the period of making this report, Government have completed their enactments, and extended libetal aid for the promotion of Internal improvements in the Province. They have amended the charter of the London and Gore Railroad, and under the title of "The Great Western Railroad Company," authorised negotiations with your company, under certain provisions; and the issuing of Debentures in aid of their work, confining their appropriations to the distance between Hamilton and Woodstock, and providing for the final location of its western termination, by Engineers to be appnoited by the Governor—thus giving it the character of a public road for the promotion of general Provincial interests, and of course expecting its location will be such as will best promote that interest, and attract commerce and intercourse most extensively to her capital and commercial cities.

This is a subject of great importance, and will address the hopes and feelings of many with considerable effect. The location of roads through a vast extent of fertile country, connecting all its population, business and intercourse in the most favorable general arrangement, is one of difficulty and of great importance.

The foregoing details of facts may be thought, by some, to constitute serious impediments to a faithful performance, on my part, of the duties of your Engineer. To me it seems otherwise. It is impossible for the information of an Engineer, on all subjects relative to the topography of the country, in the neighborhood of which his professional labors are engaged; of its population, their wants and wishes, of its means, resources, plans, purposes, improvements, connections, and means of intercourse, to be too extensive. If he be a man of probity, experience, and skill, the more he has of such information the better; for it will enable him, with greater success, to adapt his services and recommendations to the profit of any work with which he may be charged. The exertions I have been called to make in the Province, have brought me into useful communication with many of her worthy inhabitants, afforded me opportunities of understanding her soil, her timber, her streams, her minerals, her settlements, her agricultural, commercial, and manufacturing facilities, and her actual intercourse and means of prospective advancement, better than I could otherwise have done without much longer enquiry. And I am conscious of very strong convictions in favor of the importance of prosecuting Internal Improvements in the Province, with the greatest vigor, upon a scale so large as to embrace the interests of all.

It ought not to be expected of an Engineer, that he should be so absorbed, by devotion to any sectional interest, as to be insensible of the value of other interests, and the power by which they are likely to be advanced. Such an absorption would sub[illegible]

to errors equally disreputable to him, and injurious to his employers. Exempt himself from the bias of special pecuniary interest, in the result, the elevation of his views, and the comprehension of his knowledge, guided by long experience and habitual meditation, upon such subjects, ought to enable him to judge more safely than others, for the interest of the Stockholders. He should certainly be cautious of giving hasty and inconsiderate opinions; but when properly called upon to express his views, should be prepared to present facts and plans collected and matured, with all the industry and ability of which he is master, and combined under a deep sense of all the objects of his trust. In his recommendations, all the capitalists, who make investments in the work, to which they refer, are interested to hold him, and they should hold him, to no slight accountability.

The object of your company is great, in all its bearings, and I am satisfied, is entirely feasible, and you expect much from a professional report upon it. This expectation is natural and reasonable; but it cannot be met without fearful responsibity, on the part of your Engineer. A preliminary survey, carried on with rapidity and under disadvantageous circumstances, through a country presenting a wide extent of wilderness compared with settled portions, to elucidate a vast plan of improvement, in which every settlement already formed feels a lively concern, and every new-comer finds the principal motive to determine his individual residence, involves in every step of the progress, much care and anxiety, and these are rendered still more grave, when the survey is looked to, for eliciting facts, and suggesting plans, which shall lead to large investments of money for stock, already in part subscribed for, and for opening such expansive means and facilities of internal communication, as will strikingly advance private interest, and the general prosperity. Under such circumstances, it is due to those interested in the survey, on either side of the proposed lines, as well as to myself, to say, that I have been compelled to confine my instrumental examination to a single line. This compulsion has been the result of limited appropriations to meet expense, and the shortness of time, after the survey was commenced, before uncontrollable impediments would arise from the approach of Spring.

The country to be traversed by your road, on which the location is to be situated, is a belt from five to twenty miles wide, except at or near the terminating points, extending from Niagara to Detroit rivers, along the north shore of Lake Erie. This belt is bounded on the north by the river Thames—a range of high lands stretching from Westminster easterly beyond Norwich—and the Welland River. From the Niagara westerly the most favorable location is found in a direct line near the lakes. To this line our work is confined, by extensive low lands and swamps, further north, discharging into Welland river. It is expedient to avoid the southerly bend of the Welland Canal feeder, which requires passing along the south side of Broad Creek, both of which objects may be answered, by a continuation, on favorable ground, of the same direct line to Grand River and far beyond. This location is very fortunate, in all respects, as the surface which it occupies is unbroken by water courses, and rises but little above the Lake level. From Black Creek to Patterson's Creek, there is but one direction, in which an uniform and easy grade can be secured, in rising from a lower to a higher table of country. And this direction falls in with a continuation further westward of the same straight line with which we commenced. From Grand River to Black Creek, the table lands are every where of easy passage. But the valley of this Creek, as well as that of Patterson's Creek, present increasing difficulties, at every point, approaching the Lake, which, with the projection of a high ridge from the north as far down as the village of Simco, designate that as the most eligible, for the location of our line. From Simco westward, the general elevation of the country is two hundred feet above the lake level; and the streams by which it is intersected, plow it into ravines, deep, wide, with abrupt banks, in proportion to the length of their progress from their sources. Besides, the drainage of the country, in this section, originates longer water courses than exist elsewhere on the route, in consequence of the greater space between the various points of its discharge, into the Thames, Grand River, and the Lake respectively. These circumstances result in offering diminished difficulties, on a route further from the Lake shore. On such a route the difficulties may be confined to the crossing of Big Creek, Otter Creek and Kettle Creek, which draw their supplies from a higher range of country lying in between the Thames and Grand River. This presents the possibility of finding a line further north, but north of the line as shown upon the map, higher land makes down between the streams, creating an increase of summit, and producing inequalities of surface much more unfavorable.

On the Otter Creek, from the proposed line southerly to the lake, greater difficulies present. The surface is diversified by numerous ridges and ravines, bold and deep, many of them lying at an angle of ascent vertically of 30°. The soil is sand and clay, greatly indurated, and covered by extensive forests of pine. On the south of the proposed line, lie Yarmouth heights, between the Catfish Creek and Kettle Creek, along the line of Talbot street. These heights will require the curve which must be adopted in pursuing our course westerly to be established in the vicinity of Kettle Creek; where the final arrangement of the curve, and connection of the tangents, cannot be judiciously determined, without extensive and careful surveys. The valley of this creek, offers difficulties not to be encountered below St. Thomas.

From St. Thomas westerly, the high levels of sand formation continue in a narrow belt terminating at the O. At this point and farther along the Lake shore, the waters of the Lake have evidently encroached upon, and worn away, the dividing ridge, from which the drainage passes northerly into the Thames. This tract is broken by numerous short and deep ravines, and intersected by small ridges of sand in a part of its surface, making it unfavorable, and in places impracticable to locate a line upon it. Between this and the Thames the land is lower and of a more favorable description. Portions of it in the vicinity of the dividing ridge are encumbered by swamps, but nearer the river, and yet above the short ravines extending southerly from it, is a very favorable line of country, the soil being clay covered with oak, maple, black walnut, and other varieties of timber, and gradually descending toward the west, to a low level occupying the whole distance between the Lake shore and the Thames. West of the O and Chatham, the same level without ravines or undulations continues to the Detroit river.

The settlements on the lake shore have been fostered and will continue to rely chiefly upon the commerce of the lake. They will be somewhat affected by the location of our road, but much more concerned to encourage facilities of communication extending at right angles across it, from their own doors to the interior. By these alone will interior productions come down to them, and the demands of the country for merchandize, salt, and other articles from abroad, be made conducive to the increase of their trade and wealth. But there are several important settlements more inland, which cannot fail to be greatly, and most of them, beneficially interested in your enterprise. Simco, situated in what has been long known as the Long Point Settlement, is now designated as the centre of the new district, and growing in importance. St. Thomas, a flourishing village upon Kettle Creek, at the crossing of Talbot street, Chatham, occupies a point of much promise at the head of steam navigation on the Thames, and is putting forth laudable efforts to call out all of the advantages of her position. Dunville, on the Grand River, at the point where the Welland canal intersects it, is secure of a rapid augmentation of population and business. The water power produced here, by the dam erected for feeding the canal, with the navigation of the river above and below it, and of the canal itself into lake Ontario, and by means of the Chippawa river, into the Niagara, make its advantages conspicuous. Already in has become the site of extensive lumber establishments; which are beginning to turn to good account the valuable forests extending far and wide within its reach. The demands for lumber are greatly increasing upon the lakes Erie and Ontario; and the ease with which saw logs may be brought to Dunville from large and unculled regions, and after being manufactured there, shipped at the mills, for either a southern or northern market will first call into activity large amounts of capital and enterprise at this point; and they will be augmented by every opening of the adjacent country to other branches of productive labor, and by a growing commerce with the Lakes in other articles.

The residue of the belt, being a great proportion of its entire extent, is yet so little settled and known, as to leave important positions for towns, (between the Grand River and Chatham particularly on the proposed line of road) to be determined

chiefly by your, road, and future improvements to connect with it.

It will be perceived, by the foregoing description, and the Map herein referred to, that the most favorable location of your road, will give it an extraordinary character. The physical condition of the country, the position of its leading settlements, and the largest accomodation of rich agricultural tracts, all conspire to point out a route from the Niagara to Detroit Rivers to consist of two tangent lines, each over one hundred miles long, and connected in the centre, by a curve so gradual as not to be distinguishable from a straight line, in short distances, by the eye! The formation of the country is peculiarly favorable for a railroad; the surface being level or uniformily ascending and descending in such a manner as to admit every where of easy grades.

The principal difficulties will be encountered at five pla es on the line, to wit, at Grand River, Patterson's Creek, Big Creek, Otter Creek and Kettle Creek, and none of these are very formidable! The first, will require a draw bridge and an embankment under favorable circumstances; the second an extra amount of both deep cutting and embankment, and culvert at Patterson's Creek. The other three streams are proposed to be crossed by bridges, after the form of Long's or Town's, enclosed with a double track supported by timber piers from the bottom. These piers are to be covered for half their height, with cones of earth brought on the road and dropped around their base, the upper portions enclosed in connection with the main trunk. The object of this is to strenghten the piers, and preserve the rimber from decay below the earth, to serve as a foundation, when a re-construction shall be required. These bridges will be about 1000 feet in length each, and 80 feet above the stream. Their cost will be found stated in the estimate.

The extraordinary lengths of straight line on your road are attainable with little or no extra expense, and are unparalleled in the history of similar improvements. And they are the more remarkable as the line crosses the whole drainage of the country at right angles. These desirable distinctions of your undertaking do not depend upon conjecture, but from an actual survey of the whole route, and a level carried through it, except a small portion of the west end, where the land rises but slightly over the adjacent waters, and where the line may be run in any direction best comporting with the policy of the company.

So far as my survey is necessarily connected with the decisions of the commissioners, by their resolution adopted in March last, at the town of St. Thomas, I see no difficulty in the proposed terminating point on the Niagara; and would establish the other termination at the wharf and landing of John Prince, Esq., in the town of Sandwich.

To establish any portion of the route definitively, by a preliminary survey, cannot be expected, nor is it practicable with a just regard to prudence. The best final designation may be effected, by such variations of the ends of the tangent lines and the curves connecting them, as more minute and detailed examinations shall serve to recommend: and such examinations cannot be duly made without much scientific and vigilant application with transit instruments, in establishing correct lines, and corresponding expense.

The desire to adopt the greatest extent of straight lines, and the easiest curves attainable, may be deemed needless. Experienced men seek for them with great solicitude; and for their sake will incur large extra expense. They are the shortest line possible, and may serve to telegraph from each station house through the line; they promote the safety of rapid motion, in the heavy locomotives employed upon them; they give reputation to the work in which they appear; they offer more attractions in favor of profitable connecting improvements; and of course hold out stronger inducements to the investments of capital. These considerations, in addition to those herein before adduced in their favor, make it the duty of the Engineer to adopt them if he can, without exorbitant extra expense.

The line of location to commence on the Niagara river at a point convenient for ferriage—convenient for constructing suitable wharves; and where it will be found practicable to make eligible purchases of a site for the termination of the road line. Thence southwesterly, on a curve of ten thousand feet radius, two miles, nineteen chains, and eighty-two links, to a point most favorable for the commencement of the tangent lines on the Garrison reservation, known as the site of Fort Erie. Thence on a course supposed to be south, 85 deg. 45 min., west 108 miles 9 chains, to a point believed the most favorable for the commencement of a curve of one hundred thousand feet radius. Thence on the arc of said curve (the angle of the tangent being 20 deg. 30 min.) 7 miles 68 chains. Thence on what is denominated the western tangent, south 62 deg. west, 68 miles 13 chains, to what is denominated the St. Clair curve, commencing opposite the mouth of the Thames river. Thence on the arc of said curve, being 100,000 feet radii, the angle of the tangents being 33 deg. 45 min., 11 miles 12 chains 48 links, to the St. Clair tangent. Thence on said tangent 19 miles 3 chains 84 links, to the Detroit river curve, the radius of which is 20,000 feet. Thence on the arc of said curve, 4 miles 18 chains 48 links, to the wharf of John Prince, Esquire, in the village and town of Sandwich. The total distance is as follows, to wit:

	M.	Ch.	L.
Niagara river curve, 10,000 feet radii,	2	19	82
Eastern tangent,	108	9	—
Yarmouth curve,	7	66	—
On western tangent,	68	61	38
St. Clair curve,	11	12	48
St. Clair tangent,	19	39	84
Detroit river curve,	4	18	48
Miles	221	69	Chs.

Gosfield route, continuing down the western tangent 89 miles 73 chains, to the curve denominated the Gosfield curve. Thence on the arc of said curve, the radius of which is 10,000 feet, angle of tangent 63 deg. 15 min., 2 miles 6 chains 61 links. Then on what is denominated the Sandwich tangent, 14 miles 60 chains, to the wharf before mentioned in the town of Sandwich. Total distance by Gosfield, 225 miles 44 chains 82 links.

The distance from Niagara river to Detroit river at Amherstburgh, is as follows, to wit:

	M.	Ch.	L.
Niagara curve,	2	19	82
Eastern tangent,	108	9	00
Yarmouth curve,	7	68	00
Western tangent,	107	68	25
Miles	225	78	07

The said general description to allow any such changes of said tangents and curves as shall in a final survey be found best or most advantageous. The eastern tangent may be subject to fractional variations from one favorable point of location to another, particularly the location of the viaducts.

The charter does not anticipate a location of the line to Amherstburgh, a reference to which may be considered in the design, but to reach Sandwich requires a deflection from the tangent southerly as it approaches Lake St. Clair, and its continuance along the border of the Lake and Detroit River, to its point of termination. This would be shorter 4 miles 9 chains 25 links, than a continuation of the tangent to the corner of Gosfield, and thus giving it a direction to Sandwich. It may be thought expedient hereafter, with a view to claim the business and travel from the shore of Lake Erie, from Sandusky Bay to Detroit River, to obtain authority and complete the tangent to Amherstburgh. A reference to this would influence the location to Sandwich, so as to carry it direct to a point equidistant from this place and Amherstburgh. Should it be found for the interest of the Company to obtain the alteration alluded to, this location would save the construction of a greater length of collateral lines.

Before introducing the estimates of your work, I have inserted a copy of my plan and views of constructing Rail Roads, which is the basis on which the estimates are made, and to which I would call your attention.

Rail Roads are constructed in various forms. Much science and ingenuity have been applied to this subject, as well as to all the machinery to be employed upon them.

The relative value of all the forms adopted, is well understood by professional men. Those now interested in the construction of Rail Roads enjoy the advantages derived from their experience and may therefore more safely proceed in this species of public enterprise. It is the part of practical wisdom, in every undertaking, to adopt its exertion to circumstances. In new districts of country, where timber is abundant, the soil rich and deep, and secondary formation, where capital is scarce, and the rate of interest high, prudence dictates the adoption of different methods from those that may be most suitable under different conditions. I have compared all the forms of construction, which have come to my knowledge. After diligent inquiry, with much solicitude, in reference to the cardinal points of economy in their construction, durability and efficiency, I have adopted, as the Engineer of the Tonawanda Rail Road, one of the following description, which is now in use, with Locomotive Engines of a heavy class, and full freighted trains. The experience of two winters of great severity, confirms the claims here set forth, and its entire efficiency and tendency to keep in perfect adjustment, without the usual annual repairs.

1st. Blocks of round timber, from 18 to 24 inches in diameter, sawed with parallel ends, at right angles with their length, are placed in an upright position, with one end resting firmly on solid earth, from which all roots and top-soil are carefully removed. Of these blocks there are two lines, 5 feet apart, from centre to centre, across the road. These blocks will vary in length according to the surface of the ground compared with the grade level.

2d. Timbers 9 feet long, 1 foot in diameter, spotted on the under side where they are to rest on the blocks, and cut down six inches deep in a notch 15 inches wider above the blocks, where they are to receive the string-pieces. These are placed across the road from block to block, each end extending outside of the blocks upwards of one foot.

3d. String-pieces from 18 to 24 inches in diameter, and either twenty or thirty feet in length. These must be squared at each end—one foot square—and at each intermediate ten feet, where they are to rest upon the cross timbers above the blocks, and parallel with each other, in two lines lengthwise of the road. They must be well hewed on the upper side, and firmly keyed into the cross timbers.

4th. Scantling, 3 by 4 inches square, placed on their broadest side, must be extended along the top of both lines of string-pieces, parallel with each other.

5th. Above the scantling, in exact parallelism, are to be placed two ranges of iron bars five or six eighths of an inch in thickness, and two and a quarter inches wide; and then the iron bars and scantling are firmly secured to the string-pieces, by spikes seven inches long, driven through them both, into the string-pieces.

After the road is located, and the grade line established, the timber work is completed, on all parts of it requiring embankment, and not subject to cutting of more than two feet in depth. A kind of working car is then used of simple construction, with four, six, or eight wheels, having either of them four boxes, so contrived as to discharge half their contents between the two lines of string-pieces, and half without them, and carrying a cubic yard of earth to each wheel, and thus the embankment is made. Where the cutting is deeper, these cars advance one or two hundred feet, on temporary ways, being moved by horse power, and as the excavation proceeds, the permanent timbers are duly placed and secured, and the road completed. The timber work is all covered by earth within the grade to the surface of the iron, except room for the flange of the wheel. Any kind of timber may be used for the blocks and cross timbers; the string pieces should be made of the best timber afforded by the line of road or the adjacent forest.

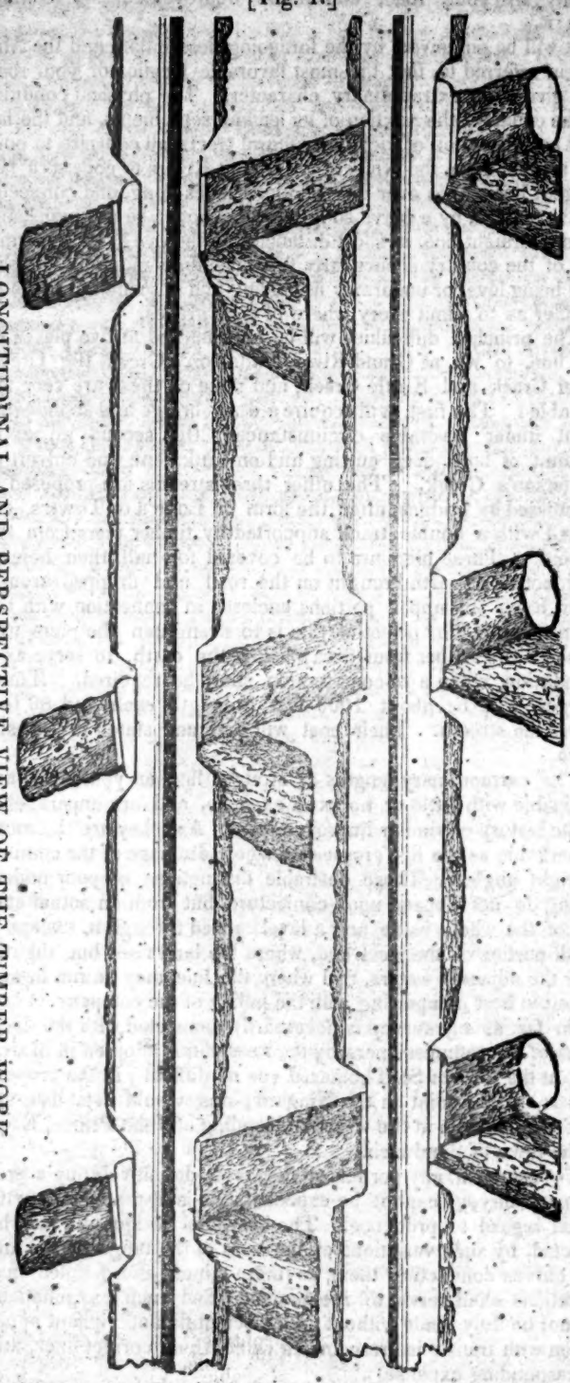
[See Fig. 1.]

The earth for embankments, and in excavations, stone and lime culverts, sawed scantling, iron, &c., are all moved on the line by cars.

[See Fig. 2.]

Men of much experience in constructing public works, particularly Rail Roads, have sought with much anxiety for some better means of applying the necessary labor, than that afforded by

[Fig. 1.]

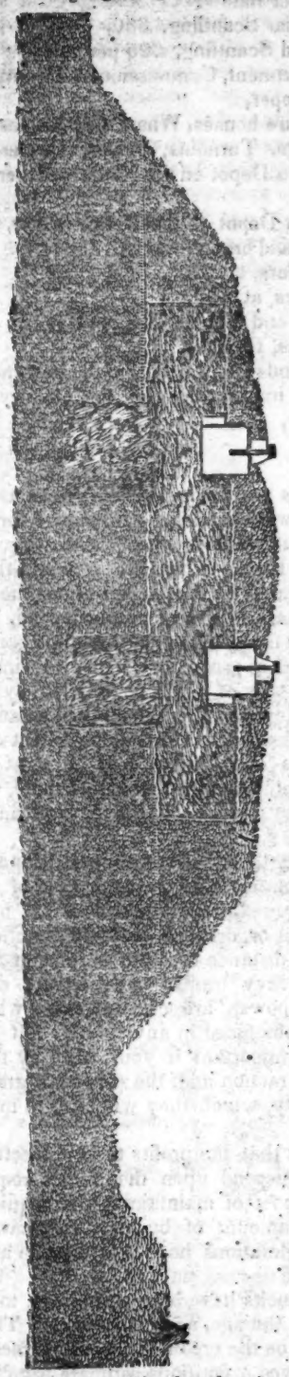


LONGITUDINAL AND PERSPECTIVE VIEW OF THE TIMBER WORK.

placing it under contract. This means has always made it difficult to secure fidelity in the work, and leads to innumerable controversies and delays in the progress of contracts, and in their final settlement. A method of proceeding, in the construction of the Tonawanda Rail Road, has been adopted, which avoids those evils almost wholly. An active practical Superintendent, with a party of twelve or fifteen hands, takes charge of the timber work upon a given section of the road. This Superintendent hires and discharges his hands at pleasure. He subsists, pays, and directs their labor, keeps a weekly work list, and is responsible for the industry, fidelity, and enonomy of the whole. Where cuttings occur, a car of suitable dimensions for the particular work, with a horse, is placed upon the timber work, under a Superintendent and similar regulations. All these parties act in the spirit of an animated competition with each other, and each is proud of having made good progress, during the week, as per estimate of his work, by the resident Engineer.

In the first organization of the Company, the Directors appoint an Engineer, Commissioner and Executive Committee. Th

[Fig. 2.]



CROSS SECTION AND VIEW OF THE TIMBER WORK IN THE GRADE.

Commissioner is chiefly responsible for the construction of the work, in all its parts.

The office of a Commissioner, is one of exceeding interest. On his talents, industry, personal vigilance and example, the activity, economy and progress of every department of action, will very much depend. To much knowledge of the local business and resources of the country through which the road is to pass, he should add the benefits of experience in conducting labor; and should think it no hardship to exert his energies, most of the time, in person, and on foot, to advance the various labors on the line, and secure fidelity in all.

In building the road—the more artificial structures—and all the scientific details, he is directed by the Engineer. He receives the money to be disbursed from the Treasurer, and accounts, monthly, to the Executive Committee for its faithful application.

The ordinary mode of constructing wooden roads, is to lay two paralell ranges of sills or string-pieces lengthwise of the road, six inches by six inches square, or four inches by six or eight square, or plank two or three inches by nine or twelve inches sawed timber, with cross-pieces laid at right angles with those placed from three to five feet apart, eight feet long, and five or six inches by eight inches square; the rails, on which the iron rests, being six inches square, or five by seven inches, and the iron consisting of bars, five-eighths or three-fourths of an inch by two and one-fourth inches wide. All this structure is placed upon the surface of the grade and filled with earth between the ranges of sills so as partially to cover the cross-pieces for a horse path. On some roads, the wooden rail has been secured by chains or castings to stone blocks placed in deep beds of rubble or pounded stone.

The more expensive and substantial roads of stone and iron are of various forms. The edge rail resting in chains or stone blocks of various paterns, is used in some cases; and in others the I rail resting on cross-timbers bedded even with the surface of the grade, and placed three feet apart with splicing chains; and in other cases still, the T rail resting upon stone blocks, or in lace of cross-timbers, split stone seven feet long, about one foot square, resting on a bed of stone eighteen inches in depth, the whole width of the track. The expense of constructing these several forms of road, varies from fifteen to fifty thousand dollars per mile.

The expense of these forms of Railroads, constitutes a fatal objection to their adoption in new districts of country; and they ought not to be adopted, if capital were ever so abundant.

1st. Experience has shown that sawed timber roads are objectionable when applied to soils of secondary formation, because the timber work has not sufficient bearing surface to resist the action of rains, which settle them into the grade; and they cannot sustain the pressure of locomotives with heavy trains.

2d. The timber work is placed in the most exposed situation possible, and the form of preparing and placing the cross timbers subjects them to the most rapid decay.

3rd. The timber is too light, yielding under the weight of the engine. This yielding and the settling together of the joints formed by the cross timbers in horizontal sections of road offer an obstruction to the passage of wheel equal to a slight ascending grade.

4th. In a northern climate, the winter frosts produce great injury on all roads. The cross timbers being covered with earth, when this earth freezes, (which is the most exposed part of the surface) the cross timbers are raised from the sills, and thus a derangement begins, which spreads and becomes considerable every year, especially in winters of great severity.

As those evils disclosed themselves to my observation, it became a great object to contrive the means of avoiding them and introducing improvements combining durability, strength and economy. These are requisites of especial importance in new districts; and difficult of attainment, in soils, rich and deep, and liable to hard frosts. They result in an eminent degree, from the constuction which I have recommended. That method finds most of the materials on the spot, in the heavy forests which encumber the soil, and which may be brought into, and constitute, a principal part of the structure, at an expense scarcely greater than would be incurred by removing it out of the way. This very valuable feature, in my plan, adapts it, most happily, to woody districts, where upon the old methods, the timber could not be sawed and delivered without exorbitant cost; and where there is timber standing, within the limits to be cleared, sufficient to answer all the demands for that article. Using large timber, in its roughest form, saves the great labor of scoring and hewing; it gives unyielding firmness to the frame work in the grade and provides ample strength for the transit of any amount of tonage. The size of the timber and covering it, (except the top of the scantling) with earth, secured its soundness for a great length of time. My examinations of timber, in similar situations, convinces me, that in close or clayey soils, it will endure from thirty to fifty yeaas, except the scantling, which is but ittle expensive, and may be easily replaced when it decays. Placing the timber work so entirely under the grade, secures it effectually against the frost, as has been fully tested, by two severe winters, on the Tonawanda Railroad. The blocks on which the upper timber work rests, are a substitute for stone blocks. They are so covered as to be durable, and so situated as to increase the strength and steadiness of the cross and longitudinal timbers, amply shoring up to the superstructure, in any description of soils, and under any pressure

rom above; which secures the road for use while the embankments are acquiring solidity.

The scantling and iron plate incorporated with the large string-pieces by strong spikes, throughout the entire length, have a bearing which will not permit them to settle, at all, from the grade line before or under the wheels of the Engine, thus leaving the locomotive its utmost power of traction, and compared with stone and iron roads has that medium of elasticity most favorable to the durability of the Engine and cars. Experience has shown that the great difficulty of keeping in exact adjustment the several parts composing a stone and iron road, creates a serious tax annually, in the destruction and wear of its machinery.

This plan of construction materially reduces the time and expenses of the Engineer department. The line is first located by transit centres, or tangent lines, and benches placed, by the test level. This prepares the way for the timber work. This being completed, the Resident Engineer gives the levels upon the cross timbers, and transfers the points of curvature from the tangents, preserving the monuments on the straight lines, and directing the several grading parties to form their slopes, as they proceed with the excavations and embankments.

It avoids the tedious detail of staking out the work for the contractor, or superintendent, replacing from time to time the stakes lost by the cutting, grubbing, embankments, &c., and requiring all to be surveyed and staked anew, when the timber or stone work, in the ordinary mode, is ready to be placed upon the grade.

The expense of a Railroad, is made up of different items of labor and materials combined in many different ways, and comprising foreign and local or domestic supplies; it necessarily involves a multiplicity of details. Whatever simplifies these, and increases the actual responsibility of those having charge of them contributes essentially to economy. Practical men know this can scarcely be too much insisted upon.

The scantling to be used for the road, I should recommend being of red cedar. There being an abundant supply on Point Pele Island, where it may be shipped to Sandwich, Chatham, Grand River, Gravelly Bay, Point Ebino, and Fort Erie, where exist good harbors for vessels, from which points it could be carried out upon the line of road; or landed at other harbors requiring but little land carriage. This timber could be used with great economy, the scantling being small and of any length. It would give you a good substitute for a stone and iron road, if I am correct in my views of the durability of timber placed in the grade.

The line is divided into three divisions, Eastern, Middle, and Western, as follows, to wit:

The Eastern Division, extending from Niagara river in the town of Bertie to Black Creek in the town of Woodhouse, being 64 miles and 27 chains.

The Middle Division, extending from Black Creek to the west line of the town of Oxford and west line of the Moravian Indian Reservation. This embraces that portion of the line that is on a high level above lake Erie. Length of this division, 93 miles 79 chains 85 links.

The Western Division extends from the town of Oxford to the Detroit river at Sandwich, being 63 miles 42 chains 15 links.

Total distance 221 miles 69 chains.

ABSTRACT.

Eastern Division	64	miles,	27	chs.		£20908	19 11
Middle do.	93	do.	79	do.	85 links,	53835	01 04
Western do.	63.	do.	42	do.	15 do.	13793	18 00
	221		69			£88547	19 03
Timber work, slashing, grubbing and cleaaring of 221 miles, 69 chains, at £250 pr m.,*						55,465	12 06

* The timber work i here estimated at nearly double the cost of executing the work in a favorable section. Portions of the route would require higher blocking in some cases in embankments and deep alluvial deposits, and in others requiring the timber moved into improved grounds, open prairies, or swamps, where there is not suitable timber; also, purchase of timber which would probably increase the aggregate expense to 200l. per mile. By the estimate I have allowed 20 per cent. in addition.

Iron and splicing plates, £450 per mile,	99,838	02	06
Spike, at £50 per mile	11,093	02	06
Sawed Red Cedar Scantling, £50,	11,092	02	06
Laying Iron and Scantling, £25 per mile,	5546	11	03
Engineer Department, Commissioner, Deputy and Book-keeper,	12,500	00	00
Workshops, Ware-houses, Wharf, Car-houses, &c., Sidelings, Turnouts, Scales, Circles, &c., at eastern Depot on the Niagara River, complete,	10,000	00	00
Do. the western Depot on the Detroit River,	6000	00	00
Station houses and branch tracks,	4000	00	00
100 Pleasure Cars, at £200,	20,000	00	00
200 Freight Cars, at £50,	10,000	00	00
15 Locomotive and Tenders, large class,	27,250	00	00
Land for Depots, 10 acres,	500	00	00
Damages for lands and fencing, in the present state of the improvement of the country, £50 per mile,	11,093	00	08
Total cost,	£371,927	11	02

The estimates are made at such prices as it is believed the work will cost, without adding per centage for contingencies.

Capitalists will think much of the connection anticipated between the Rail Roads of the Province and those of the adjoining States; because on these connections the use, and of course the profit, of them, will very much depend. And if the great lines adapted to the demands of the home poulation are laid out and opened, with a prudent reference to similar works set on foot, and in the way of rapid completion, by the neighbouring population, it is evident that the latter population will be brought to contribute essentially to the enlargement of the annual dividends, and this contribution will be most cheerfully made, being in truth only that reasonable tribute, which good sense and justice may levy upon the natural advantages of local position.

The great length of the route,—the unparalleled extent to which it is absolutely straight—the ease of the curves, where curves are required—the absence of all but very moderate grades of ascent or descent—and the practicability of passing over its entire distance between sunrise and sunset, with locomotives and heavy trains, under a very diminished pressure of the tractile power, are circumstances which could not be so extensively combined in any country but yours; and which will be equally important in your road, by the annual saving in the cost of traction and the perpetual gratifications of interest and curiosity, which they will offer to men of business and science.

It is obvious that the profits to be expected in the shape of dividends, will depend upon the outlay required to complete the work, the cost of maintaining the requisite power of traction, and the amount of business commanded by the road. All these considerations have a favourable application to your work.

Rail Road stocks have been considered, more or less, in the experiments of the age, as fancy stocks. They have been sold in the markets on the credit of popular names attached to them, and often received a fictitious estimate from the exertions of individual speculation, without any proper reference to the substantial merits of the work. But the day of such results is now past. So many Rail Roads have now been made, and in so many different conditions, as to their cost, and use, and value, that every thing concerning them has been subjected to the observation of multitudes of discerning individuals; and they are completely embraced within the experience of men of science. This experience proves that they unite such rapidity and facility of passage, both for travellers and commodities, that no expense of outlay can scarcely be too great to provide them on the great thoroughfares of internal communication. They are therefore the proper subjects of business calculation; and are often undertaken, and may be well undertaken by private enterprise. In favorable situations, where the original construction is cheap, the line when constructed of easy passage, and the direction such as to accommodate a great and growing intercourse, they will ensure abundant dividends, and soon reimburse the sums expended upon them.

The great field of profitable Rail Road investment must be found in lines of natural thoroughfare, in districts under a course of rapid settlement, where alluvial formations are spread into immense tracts, and where primitive mountains do not require to be cut down, and rock bonnd vallies do not resist, to doubls or treble the amount of friction in passing frequent and abrupt curves. The great west will witness the highest and most useful power of the locomotive. There will these wonderful powers soon display themselves, upon a scale of such grandeur and utility, as find scarcely any type in the experience of the past, either in Europe or America,—a scale which can be anticipated only by the most comprehensive and intelligent views of the magnificent expanse of her rivers and lakes—her prairies and table lands.

Grade per mile.	Length of Grade.	Ascent.	Descent.	Elevation above Lake Erie.	Distance from Niagara River.	
Feet.	MilesChs	Feet.		Feet.	MilesChs	
15	2 0	30		30	2 00	
Level	6 10			30	8 10	
	5 68		3.58	26.42	13 78	
	10 62		14.19	12.23	24 60	
	9 36		2	10.23	34 16	Acrosss the Tamarack
15	3	45		55.23	37 16	swamp to Grand river.
	26 72	3612		91.85	64 08	East bank of Black Creek.
15	6	90		181.35	70 80	Highland east of Patterson Creek.
15	1 40		22.50	158.85	71 48	Elevation of C. at Simcoe 114 feet.
10	5 40	55.0		213.85	77 08	Summit between Patterson and B. C.
	4 12		15.88	197.97	81 20	Bank of Big Creek.
Level	8 22			197.97	89 42	Summit between L. & B. Otter.
12	2	24		221.07	91 42	Big Otter.
15	2		30	191.97	93 42	
15	1 40	2250		214.47	95 02	
6	1 40			205.47	96 42	
5	3	15		220.47	99 42	Summit Big Otter and Catfish.
8	1		8	212.47	100 42	
Level	3 28			212.47	103 70	Swamp in T'ns'p of Malahide.
5	3	15		227.47	106 70	Greatest height, or summit.
8	2 14		17.09	210.38	109 04	
Level	2 56			210.38	111 60	
15	1	15		225.38	112 60	Summit between Cat-
11	5		55	170.38	117 60	fish and Kettle creek.
Level	36			170.38	118 16	St. Thomas on Kettle Creek.
10	2 39	2491		195.29	120 55	
10	1 41		15.59	179.70	122 16	
8	2	16		195.70	124 16	
8	1 76		15.39	180.31	126 12	
	17 36		40.99	139.32	143 38	South of the Big Bend
3	6 5		18.17	121.15	149 43	in the Thames.
10	2		20.00	101.15	151 53	
7	8 64		63.12	39.03	160 27	
	12 65		15.0	24.03	173 12	
	7 00		19.0	5.03	180 12	
Level	12 17			5.03	192 29	Low land south of Lake
3	1	3.00		7.43	193 29	St. Clair.
Level	14 40	0	0	7.43	207 69	
3	6	18		25.43	213 69	
Level	5 60			25.42	219 49	High land east of Detroit River.
10	2 4		20.26	5.17	121 54	
Level	15			5.17	221 69	Wharf at Sandwich.

Whole ascent West, 409,53
Whole descent West, 404,36
——5,17

Average ascent per mile for the whole line is 1 $\frac{85}{100}$ feet.
Maximum grade, 15 feet per mile, in short sections.

All of which is respectfully submitted for the consideration and further order of your honorable board.

ELISHA JOHNSON,
Chief Engineer.

Engineer's Office of the Niagara and Detroit Rivers Rail Road Co.
May 1, 1837.

Circular.

Continued from p. 510.

Having thus given a sketch of the mannet in which it is proposed to conduct the inquiries on particular subjects, in respect to which it would confer an obligation on me to have your suggestions, or those of any other experimenced farmer, I proceed to other great topics, to be embraced by the survey.

Salt. Marine Shells. Gypsum Clay. Sand. Marl.
Dock Mud. Ashes of Mineral Coal. Burnt Clay.

3. Vegetable Manures.

Ashes of wood and peat. Soot. Tanners' Waste. Straw.
Leaves. Sea Weeds. Rape Dust. Street Manure.
Green Dressings, ploughed in. Buck Wheat. Clover.

4. Artificial Manures. Composts.

5. Modes of applying Manure.

Mixed or clear; solid or liquid; in drill or broadcast; in fresh or fermented and decayed state;—at what season of the year or crop;—annually, or how often; in what quantity.

Use and application to permanent pastures and mowing lands.

6. Manure Houses or Cellars; Vaults for the preservation of urine; and provisions for forming compost manures.

Machines for the application of liquid manures.

XIII. Live Stock.

1. Black Cattle. Horses. Sheep. Swine. Poultry.

2. Comparative value of different Breeds of animals for Stall, Work, and Dairy; and notices of herds or individuals of improved Breeds, with places where found.

3. Animals known among us. Native; Hereford; Black Spanish; Devon; Holderness; Yorkshire; Alderney; Ayrshire.

Improved Durham Short Horns.

4. The subject of Breeding.

XIV. Animals for Labor.

Horses and Oxen. Comparative value. Mules. Cost of, keep; harness; shoeing; deterioration or improvement.

XV. Animals for Beef.

1. Sex most eligible.

2. How reared; as calves, how fed; how long with the cow; how managed the first winter.

3. What age at maturity. Age best for fattening.

4. If pastured—average number of acres to an animal.

5. If soiled; how managed and fed.

6. If stalled on dry feed how, fed; how long kept; amount of hay consumed per day; of meal; of vegetables; kinds of meal; kinds of vegetables; how prepared; meal ground with or without cob; mixed or unmixed; wet or dry; cooked or raw.

7. Use of flaxseed; oil; and oil cake in fattening.

8. Gain per day; per month.

9. Machines for cutting and steaming food.

XVI. Market; Returns of Brighton and Danverse Markets.

1. Animals—how sold—on the hoof; or by weight after slaughter. If by weight, how determined; customs of butchers; what parts weighed; what considered as perquisites. Liabilities to error or fraud, if any; customs in other markets.

2. Different parts—how disposed of; relative value.

3. Modes of curing, packing, inspecting, beef, pork, hams, &c.

4. Drift of animals; customs of Drovers; expenses; loss in weight by travelling.

XVII. Animals for the Dairy.

1. Choice of Breeds. Examples and history of Cows of extraordinary product.

2. Size and color as affecting produce. Continuance in milking. Effects of early coming in. Disposition of the calf. Times of milking.

3. Average yield of a good cow in milk; in butter; in cheese.

4. Trials of milk as to quantity of cream; of butter; and of cheese, per gallon.

5. Modes of feeding; vegetables; grain; or meal; how given a prepared; quantity.

XVIII. Dairy Produce.
1. Butter; modes of making and preserving.
2. Cheese; modes of making and preserving.
3. Comparative profits of making butter and cheese.
4. Use of skim milk, butter milk, and whey.
5. Advantages, if any, of giving it to the Cow.
6. Value of dairy refuse for Swine.
7. What proportion between number of Cows kept, and number of Swine kept.
8. Steaming; heating; freezing milk, with comparative advantages of each method for raising cream.
9. Effects of different kinds of salt upon butter. Use of sugar and salt petre for butter. Coloring matter for cheese.
10. Protection from vermin.
11. Grasses for Dairy purposes.
Improving Peat Meadows.

XXXIV. Great Farming Operations.
1. Ploughing;
2. Sowing; Planting; Laying down to Grass.
3. Haymaking.
4. Harvesting.
5. Preserving and Expending the Produce.
6. Marketing.

XXXV. Examples in detail and in full of
1. General Farm Management.
2. Particular Crops.
3. Particular Improvements.

XXXVI. Labor.
1. Farm Labor by the month or year.
2. " by the piece.
3. Cost of Board and prices of Provisions.
4. Use of Spirituous Liquor.
5. Laws and Customs relating to Labor.

Mechanical Labor.
1. Blacksmith. Price per pound of Iron.
" Price of Horse shoeing. Ox shoeing.
2. Carpentern' Work, per day.
3. Masons' Work, per day.
4. Wheelwrights' Work, per piece.
5. General cost of Farming Utensils; Carriages; and Equipments.

XXXVII. Farming Implements, &c.
Ploughs. Harrows. Horse Rakes. Cultivators and Horse Hoes. Threshing Machines. Winnowing Machines. Vegetable Slicers. Hay Cutters. Rollers. Drill Machines. Corn Planterrs. Corn Shellers. Wheel Carriages. Stump Extractors, &c. &c.

XXXVIII. Condition of Roads and Improvements in Construction of Roads, as intimately connected with the Agricultural Prosperity of a Country.

XXXIX. Miscellaneous Subjects.
1. Size of Farms.
2. Farm Capital.
3. Farm Accounts.
4. Laws relating to Agriculture.
5. Taxes and Burdens upon Land.
6. Agricultural Pauper Establishments.
7. Agricultural and Manual Labor Schools and Colleges.
8. Agricultural Societies. Funds. Premiums. Operations. Cattle Shows.
9. Agricultural Libraries and Publications.

XL. Manufactures connected with Agriculture.
1. Household Manufactures. Manufactures of wool, silk, flax, hemp, hair, bristles, straw, &c. &c.
2. Leather, with all its various preparations.
3. Glue. Combs. Buttons. Bonnets and Hats from grass, straw, or wool. Wooden Ware. Barrels.
Maple Sugar. Maple Molasses. Beet sugar. Potato Syrup. Starch. Opium. Sunflower Oil. Indian Corn Oil. Linseed Oil. Neat's Foot Oil. Wine from Grapes. Wine from Currants.
Cider. Perry. Beer and Ale. Whiskey. Gin.
Soap. Candles.

XLI. Objects of Particular Inquiry, with a view to Agricultural Improvements.
1. Improvements in Live Stock.
2. " in Utensils and Farm Buildings.
3. " in New Vegetables, Fruits, and Grasses.
4. " in Seeds for earliness and abundant yield.
5. " in economical Preparations and Uses of Food for Man and Beast.
6. " in economical Uses of Fuel.
7. " in economical application of human and brute Labor.
8. " in application of water, steam or wind power to purposes of husbandry.
9. " in cultivation—depth of ploughing; mixing of soils; compost manures; manuring with green crops; inverting and covering the sward; drill culture; sowiug broad-cast; management of any particular crop, &c. &c.
10. Improvements in rotation of crops.
11. " in uses of Lime; Gypsum; Bone dust.
12. " in application of Ashes; crude or spent.
13. " in application or discovery of other manures.
14. " in construction of Farm Buildings.

XLII. Exports and Imports of Agricultural Produce.
Capacity of the State to supply its own Wants. General views.

XLIII. Specimens of Soil to be analyzed.
Models of improved Implements.
Models of improved Buildings.
Sketches of improved modes of draining lands.
Collection of valuable Seeds or Plants.
Samples of Wool, Silk, and Sugar.

Saxon Sheep and Wool.—E. Tilden, Esq., P. M., New-Lebanon, Col. has a flock of 1,000 Saxon, and Saxon and Merino crossed sheep, which he considers of the first grade, and offers a part for sale—the bucks at from five to twenty-five dollars, according to age and quality. Samples of the wool from these bucks, have been deposited, for examination, at the office of the Cultivator.

J. C. Van Wyck, of Fishkill, Dutchess county, has also a flock of 500 prime Saxon sheep, bred with great care, which he wishes to dispose of—price not mentioned.

REMARKS OF THE CONDUCTOR.

We have adverted to the subject of bone manure in our second and third volumes, and stated our mode of obtaining and preparing it. We have been less urgent upon this matter, because we saw little hopes of our farmers regarding this source of fertility, while they remained reckless, as too many of them do, of their dung and other sources of fertility which abound on every farm. The subject shall receive our early attention. In mean time, in reply to Mr. Foote's questions, we answer, first—the time *has* come for every farmer to husband and apply to his lands, all the means of fertility at his command. Bone dust will not prove serviceable upon clays. It is applied at the rate of 20 to 40 bushels on an acre. Bone mills can only be profitably erected near navigable waters. Secondly—bones can be crushed in plaster mills, so as to answer well. Thirdly—bones that have been boiled are deemed as good as those which have not been boiled, and old bones nearly as good as fresh ones. And fourthly—not only potato tops, but sedge grass, weeds, straw, and every sort of vegetable matter, or earth abounding in it, as that from swamps, ditches, ponds, &c., leached ashes, soap suds, urine, &c., may all be profitably commingled in the dung yards, which should be made concave in the centre, in order to retain the liquids of the yard, and which these vegetable matters will absorb. And the yard should be thoroughly cleaned every spring, and the contents fed to hoed crops.

Ruta Baga Hoe.—We have been presented with a neat little implement for thinning turnips, or other crops, manufactured by Wm. R. Gates, Lee, Mass. It is for sale by Thorburn, at the moderate price of 37½ cents, including the handle.

XXVII. DESCRIPTION OF THE METHOD OF ROOFING IN USE IN THE SOUTHERN CONCAN, IN THE EAST INDIES, BY LIEUT FRAS. OUTRAM, BOMBAY ENGINEER. COMMUNICATED IN A LETTER TO THE LATE PRESIDENT, T. TELFORD, ESQ., BY MAJ. GEN. SIR JOHN MALCOLM, G. C. B. &c., GOVERNOR OF BOMBAY.

Extract of a letter from Mr. Telford, enclosing Mr. Outram's Paper.

"I beg to present to the Institution, a paper describing a mode of constructing "stone-roofed buildings in the East Indies, "which, although it may be little applicable "in this climate, yet seems of considerable "value as relating to an important part of "the British empire. It has been transmitted to me by direction of the Governor of "Bombay; as will be seen by the accompanying note of his private secretary.

"'I have much pleasure in sending you, "'by desire of the Governor, the accompa-"'nying copy of a letter from Lt. Outram, "'of the Engineers, on the subject of stone "'roofed buildings. The few houses which "'have been already constructed on this "'plan, have been found to answer so well "'that I understand Government have re-"'solved to construct, on this principle, all "'the public buildings, wherever suitable "'materials are to be procured.'"

Nature of the arches composing the roof.

The roofing with stone (iron clay or laterite) in the Southern Concan is of a compound nature, consisting of two kinds of arches, the first being parallel to each other, from 2 to 3 feet apart, and very light; their average section being from 12 by 10 inches to 15 by 12; i. e. for roof of from 25 to 35 feet span; so that when any two of these arches or ribs are complete, they are strong enough to bear slabs of stone 5 or 6 inches thick, extending a few inches over each, beginning from the wall and meeting at the top, thus forming a second complete arch, and making, with the ribs, a compound much stronger than vaulting of equal solidity over the same extent, made in the usual way.

Their lateral thrust.

The arches of one room are counteracted by those of the rooms on its sides, and so on for any extent; those of the end rooms being counteracted on their outer sides by buttresses or by the walls of baths, &c., so that the walls are required to

Walls.

to be only sufficiently strong to support the mere weight of the masonry of the roofs, which has an average thickness of about 9 inches, excepting the plaster or tiles, and therefore in rooms of 400 square feet would be about one-fifth weight of the upper

Comparative weight of the whole roof.

walls of a two-storied house. As the roof itself is of considerable altitude, the walls supporting it need not be of more than two-thirds the usual height.

Loading of the arches.

One advantage of the lightness of these roofs is, that of whatever form the arches may be, very little *loading* will suffice; of course some arches would require no loading, but such

Their form.

are the most convenient for roofs in general. The best appears to be a compound of two segments of a circle of 50 or 55°, their chords intersecting at an angle of about 100; such compound arch requiring a little loading at the top and the

And outer surface.

haunches, which, when duly added, gives an outer surface of two inclined planes to each roof, which may be thed either plastered or tiled. But instead of loading the haunches throughout with solid rubble, it is beeter to do so partly with hollow masonary, to the upper surface of which may be given any slopes, which by the connection of the opposite slopes of any two adjacent roofs, from a gutter of the securest kind. The average height of this gutter should be about one-third that of the roof, if to be plastered, but not so much if the roof is to be tiled.

Comparison between the expense of houses with stone roofs and those tiled.

The expense of these roofs, including the outer plaster, has been found by myself and successor, in the Concan, to be much less than that of tiled roofs over the same extent. The walls should cost no more than those of a substantial bungalow, for although the transverse walls have a greater weight to support, yet as they need not be only two-thirds the height, their total expense should dot be greater than that of the walls of a substantial house. The only part of which the comparative expense remains to be considered, is the ceiling. The inner surface of the stone roofs, when finely plastered, forms an excellent ceiling, being light and cleanly, and most durable. The expense of this plastering, if not much ornamented, is below one-third that of the lath and plaster generally used.

Hence it is plain, and has been practically found, that the total expense of stone-roofed houses in the Concan, if properly constructed, is less than that of tiled houses of the same size; but the sums saved in annual and special repairs are of far greater consideration.

In the Deccan.

In the Deccan where timber is so expensive, the comparative cost of the buildings would be still less, in all those parts where proper stone is met with.

The principal cause of the cheapness of these stone roofs, is the very litle centering, &c., requisite. For as the ribs or primary arches, are very light, centering of the simplest kind does for any one of them, and thus for all successively in either room. But as the centering cannot be removed from any rib till its counteracting ribs are complete, there is of course required one centering for each room, which, when one series of the primary arches is complete, may be removed with ease for the next, till a convenient number are ready for the superior arching, which of course is very quickly formed (as before described) without centering.

Stones fittest for these roofs.

The materials fittest for this kind of building are the various kinds of sand-stone, including the calcareous sand-stone of cutch. The laterite, or iron clay, although a good material, and the only one hitherto used, is apparently not so proper as the substance generally called free-stone, which, if worked with saws, &c., would be found to answer better than the laterite, which can be shaped only with a pick-axe, and is very heavy. This iron clay is found to extend from Bancoote E. N. E. to, I believe, Ceylon, lying over the trap-rock, even on the highest Ghauts, but is very unequal in thickness and quality; that of Purnalla and Pawnghur, for instance, being of the softest and most porous kind, and that near Mahabulesher of the best. This stone, when exposed to rain, &c., becomes very hard if good, but if taken from any depth, is so soft as to be easily cut with a knife. It is hence called *soap-stone* at Belgaum and other Madras stations.

Method of working the ribs.

In making the primary arches, each workman should be provided with a small square, one leg of which being laid on the centering, the other will, of course, be the prolongation of a radius of the arch's curve. In beginning the arch, therefore, the workman has only to cut (with a small pick-axe for laterite, and a chisel for sand-stone) the upper end of the first stone, till it is adapted to the square, after which another stone is hoisted up, (the pulley being sufficiently high to allow it to swing freely over the centering,) and its lower end easily fitted to the surface just

Securing them for the superior archway.

prepared; the upper end of it is then cut to the square for the reception of a third, and proceeding thus, both sides of the arch are formed till they meet in a key-stone at the top, which should be connected, *pro tempore*, by a slab, with the side wall, or with the next rib, for otherwise, these primary arches or ribs might be shaken down during the formation of the superior arches.

Advantages of the above method of working arches.

By the use of the square, the joinings of the arch-stones must all properly concentrate, although made by the most stupid workmen, and the arches are rendered perfect in much less time than they could have been by cutting the stones to chalked lines on the ground, as is usually done; besides, the stones may be of various lengths, and are thus worked with more freedom, and none spoiled.

Superior arches.

The stones of each superior arch should be cut at their ends, so that their inner surface be an inch or two below the upper surface of the ribs.

Plaster for the outer surface.

The cuttings of the laterite, good chunam, and sand, (sea sand should never be used,) in equal parts, form an excellent plaster for the outside of these roofs. The cuttings, or stone rubbish, will do pretty well without sand, but it should not be very finely powdered.

Precautions necessary in finishing a plastered roof.

The roof having been well washed, and not allowed to dry, the plaster should be laid on it throughout at once, and about two and a half inches thick. No fine ceunam should be put over this plaster, but it must be constantly beaten with small pieces of wood, for two or three days. As the tempering of the plaster is of great consequence, every seven or eight square feet should be under a boy, who has, besides the piece of wood, a pot of water, to keep the chuman moist the whole time; at the end of the two or three days the plaster will have become very hard, and less capable of absorbing water: but after the boys have left it, there should be a sprinkline of water over the whole, as long as possible, for the longer these roofs are kept damp, the stronger they become. Their surface should not be left very smooth; but if any cracks appear, they show that the

chunam has not been properly beaten, and should be filled by rubbing fine chunam into them.

In places subject to heavy rains. As new chunam, however properly made, absorbs water, it will be advisable in the first season to guard against very heavy rains, by covering the surface with a thin coat of wax and oil, which is easily done by rubbing the mixture on the roof in the heat of the day.

Tiles may be used. But if chunam be scarce, or if it be not very good, the roof should be covered with tiles, (which would cost less than the plaster,) as may be seen by the small proportion the tiles bear in the expense of a tiled roof;—the form of the roofs render such an addition very easy.

If adopted in Europe, buildings of this kind would be as remarkable for warmth as in this country for coolness. But the plastering outside would not be advisable on account of the frost; tiles, however, or slate, would protect the roof completely.

Advantages of stone roofs, &c., in India. The principal advantages of these buildings in this country are, their coolness, and the little expense incurred in annual and special repairs; indeed, the latter will never be required if the building be properly constructed at first. It is also very evident that they can never take fire, nor can white ants affect them; of course they could be built of several stories, the form of the floor ribs being merely a small segment of a circle, (or ellipse,) instead of a compound of two as in the roof. The upper floor of the jailor's house at Rutnaghery is thus built, as also part of another house.

All the buildings hitherto constructed on this principle are, in a climate perhaps the most unfavorable in India; for there is not a terraced roof, constructed in the usual mode over wood, that is proof against the excessive rains of the southern Concan.

In some parts of it a mixture of stone and brick advisable. This system could not be be so economically adopted where trap or whinstone only is procurable, unless wood be very expensive, as at Poona; where a compound structure of roofs, between stone and brick might be found even less expensive than common tiled roofs.

I take the liberty to add some remarks on brick and compound roofs of a similar construction, and a proposal for the use of domes in some cases, which I presume would be found more beneficial, and less expensive to government, than certain tile-roofed buildings.

Stone ribs. In the compound roofs, the primary arches, or ribs, to be constructed nearly as before mentioned, but being of harder stone, not so massive; the breadth of their section to be greater in proportion to the height. For arches of thirty feet span, the section of the rib stones may be as in the annexed sketch: their length being from two to four feet. The slopes at the upper corners are made for bricks.

Connecting slabs. The ribs thus formed to be connected together by slabs of the same stone. One slab between every two at their tops, and another at each side, about the middle of the segment; the distance between the ribs to be about 3 feet.

Centering for the brickwork. When thus formed, a piece of planked centering may be placed between any two ribs from the wall to the first connecting stone, so that a thin brick vault may be completed over that space,—the sides of both having been prepared (as before stated) to receive it. One piece of centering, in length only one fourth that of the ribs, and two or three feet wide, (consequently extremely light,) would suffice for the whole of the superior arching of a room, for the connected strength of the ribs (by the lateral stones) would be quite enough to sustain the then intermediate arches of brick; similar parts being done in succession, until the whole be covered. But care must be taken that a proper resistance

Resistance against the latteral thrust. be secured against the lateral thrust of the brick-work, which, however, is so very light, that an ordinary thickness for the side walls will do, if the two side ribs of each room be placed about one foot and a half, or two feet from them, so that, as with the laterite, flag stones might lie on the intermediate space; by the loading of which, a much greater resistance than requisite might be obtained.

Roofs of brick throughout. If roofs are made of brick throughout, the proportion of the ribs and the vaulting should be somewhat different; for 25 feet span, the ribs should have a section of 18 by 8 inches, and their intermediate space be about two feet wide, so that the ribs will nearly of themselves sustain the vaulting.

Conoidal domes. In many cases, however, surmounted domes formed on a compound conoid, two-thirds sphere, and the upper third cone, would be the most economical kind of roofing, particularly for detached buildings in this country, where verendahs or screens are necessary to protect them from sun and rain, which object would be at once gained by arches over the butresses the loading of which with mud rubble would of course increase their resistance, and likewise present an additional obstacle to the heat.

These domes would be found particularly advantageous in government buildings; for instance, those in the military department, in comparison with the barracks, storerooms, hospitals, &c., now in use; they are far more easily ventilated by holes and windows, unlimited, at the sides, and one at the top of the roof, (the clumsy method adopted at present in barracks shows the necessity of ventilation,) and the great space inclosed by the roof alone ensures a plentiful supply of fresh and cool air in the closest days. —Secondly, their interior cannot be affected in the slightest degree, by the heat of the roof.—Thirdly, they include a larger space in proportion to their interior surface, thereby requiring less superficial repair, and being more easily kept clean.—Fourthly, they are altogether free from special repairs and cannot take fire, nor being affected by white ants, which have hitherto not only destroyed buildings, but also the men's kits and public stores, the risk of which is perhaps of greater consideration, than the sums expended annually in repairing the buildings now in use; but those sums also would be saved in these brick-roofed buildings, except indeed whitewashing and repairing the floor for the tiles of the roofing being fixed with chunam, would require no turning. They should be placed in horizontal divisions, by which means all angles will be avoided, and unless the tiles actually break, there will be no repairs whatever requisite to the roof.

If the expense of annual and special repairs to buildings in general be considered, together with the destruction of stores by white ants, the loss by fire, and the loss of health, occasioned by the extemes of heat and cold under tiled roofing, it may perhaps be allowed that were roofs of masonry gene-

Comparative expense. rally adopted by Government, even at five times the original cost of the buildings hitherto used, there would accrue a saving of money; but it has been already proved, that the compound arched roofs are cheaper, and it may now be shown, that those with the modified domes are also very economical; for, beginning with the walls, a circle being the least possible perimeter of a given area, the walls, if made of the usual height and thickness, would be much less expensive than those of an equal quadrangular space; a square for instance, would cost one-third more, and the shape generally given to hospitals and barracks, having the breadth one-fourth the length, merely because the roof would be very expensive if wider, would cost just twice as much. But as assistance is required against the lateral thrust of the dome, the additional butresses necessary would nearly double the expense of circular walls in all rooms above 20 or 25 feet diameter, were it not that the great height of the interior of the dome itself, renders it unnecessary to make the walls more than 7 or 8 feet high, i. e. just enough for the doors &c. It will hench be perceived that the expense of quadrangular walls is greater than that of circular walls of only half their height with buttresses; and it will be seen by every one who understands the nature of a dome, that a surmounted dome, as described, would be perhaps the cheapest mode possible (unless brick and chunam are enormously expensive) of substantially covering a given space, and the larger that space the greater the advantage of this dome over wood roofs, &c.: for sgch requires no centering whatever, although 300 feet in diameter; and is built under the superintendence of one intelligent person, as easily as the upper walls of a house, because the arches over the buttresses afford a landing-place for the materials, and the outer surface of the dome gives a footing to the workmen without any scaffolding; the expense, therefore, should be estimated as for upper walls, i. e. the same rate for the solid masonry of the dome, which, together with the tiles coveriug it, will cost less than a common tiled roof, over an equal extent.

Disadvantages. The disadvantages of domes, are, their inconvenient shape for houses in general, and upper storied houses in particular, their inelegant appearance, unless the walls be of a proportionate height, which would increase the expense enormously in the buttresses, their depth being in direct ratio with the heights of the walls, so that if the height of the walls be doubled, the expense of the

buttresses is fourfold. But where no stone is procurable, a house formed of several dome roofed rooms, properly connected together, would be found not more expensive than one of the same size with compound arches, i. e. in one-storied houses only, both being made of brick. Of course spheroidal roofs may be made nearly as easily as domes, but they would cost more, and would not do so well for tiles.

WHITE OAK AND POST OAK.

J. Seelye, of Sharon, Conn., inquires, first, what is the distinction between post oak and white oak, the former being esteemed, at the south, better and far more lasting, than the latter. And second, on what particular day in the year a tree, perforated by woodpeckers, or slightly girdled with an axe, will die. *White oak* is a tree of the first class as to magnitude, and grows in every part of the United States, though in Florida it is found only on the borders of the swamps. It is the only oak, on which a few of the dried leaves persist till the circulation is renewed in the spring. Of all the American oaks, this is the best and most generally used, according to Michaux, being strong, durable, and of large dimensions. The *post oak* resembles somewhat in foliage the white oak, though the lobes of the leaves are broader, and less pointed; and its acorns are not half so large as those of the white oak. The leaf of the white oak has three, and that of the post oak four lobes. This oak belongs to the second class of forest trees, its height rarely exceeding 40 feet. It is not found growing north of the neighborhood of the city of New York, but abounds in the middle states and in Florida. The wood is less elastic, though finer grained, and more durable than the white oak: hence it is preferred for posts, and is used with advantage by wheelwrights and coopers. As to the second point of inquiry, we are not aware that there is any *particular* day in the year, and we are sure there is not, when a tree will be killed by the pecking of birds. Trees either die by cutting off the supply of sap, which passes from the roots through the sap wood, or for want of elaborating organs—the leaves—which convert this sap into vegetable nutriment. Cutting through the entire sap wood, at any time in the early part of summer, so as to prevent the ascent of the sap, or divesting it entirely of the leaves, which elaborate this sap, in June, will seldom fail to kill the most hardy tree.

THE WHEAT CROP.

Our letters from Illinois, Michigan, Ohio, and the far west, are not favorable to a great product of the wheat crop, this grain having been seriously injured by the winter; and we very seriously apprehend, that the grain worm, which our legislators have considered too insignificant to notice, will lessen the crop of our own state to a most alarming extent. We do not mean to become croakers, but we seriously believe, that the high anticipations of an extraordinary abundant wheat harvest, which our newspapers encouraged, will not be realized—this year.

PRATT'S STUMP EXTRACTOR.—We have received from J. R. Drake, Esq., of Owego, a handbill which contains a figure and description of this machine, and also certificates of its performance, which we shall forward to our correspondent, J. M. Garnet, Esq., of Virginia. The machine is worked by a pair of oxen or horses, and can advantageously employ five men. It appears from the certificate of H. Hutchinson, engineer on the Chemung canal, that with one of these machines sixty-eight stumps was extracted between 2 o'clock, P. M., and sunset; and that with another two hundred and thirty stumps were extracted in a day. It is applied to green stumps, as well as to those which are partially decayed, and without the previous labor of cutting the roots. Nos. 1 and 2 are heavy, and designed for extracting green stumps; No. 3 is more compact, and may be transported on common wagon or cart wheels. Four men, says Judge D. with two yoke of oxen and a stump-boat, will extract, and convert into fence, stumps enough for fourteen rods in a day. The price for a first rate machine, with ropes, chains, &c., is nearly $375—without the apparatus the machine is offered at $150, delivered at Albany or Troy.

SPIKED ROLLER.—Mr. J. Boyle inquires, what should be the diameter of the spiked roller, if made of solid wood? If of plank what thickness—how long the spikes, and how many rows? The size may depend upon convenience or fancy, and may range from twelve to thirty inches in diameter. Any deficiency in the weight of the roller,—for the spiked rolled must be so heavy as to press the spikes or darts into the stiff soil where it is intended to operate,—may be made up by stones or other heavy substances, placed upon the frame. The object is to break and pulverize the ground, and raise a tilth—and consequently the spikes ought to project three inches, and be sufficient in number to effect the entire surface. It will therefore require from eight to ten rows upon a roller two feet in diameter. Conklin's Press Harrow, which very much resembles the spiked roller, has 12 rows of spikes.

PLANT MULBERRY TREES.

We wonder at the remissness of the inhabitants of New-York in cultivating the mulberry tree. That it may, and eventually will, be made the source of considerable profit, there can be no doubt. In many parts of New England, the farmers have already turned their attention to this subject, which will soon add very considerably to their wealth.

Mulberry trees should be planted by the town authorities in the public streets of every town and village; and thus, while they add to the beauty of a hamlet, they may add also to the wealth of its inhabitants. In the south of France, where silk is a staple commodity, the manufacture of it is more or less the employment of a portion of the family of every farmer. The great canal of Languedoc is lined with mulberry trees. The traveller passes over highways overhung with the branches of this beautiful tree, the culivation of which distributes wealth throughout that portion of Europe.

This climate is known to be favorable to the production of silk-worms; and every gentleman of taste, who wishes to combine ornament with usefulness—every landholder who is desirous of increasing the value of his own property, and of adding a stimulus to industry, should have mulberry trees surrounding their houses, planted by the road-side, and scattered over their grounds. By pursuing this plan, the rearing of the silk-worm will in a few years become a profitable employment and fashionable amusement—certainly a harmless one.

HOLLOW HORN.—Sylvanus W. Gray, of Middlefield, Ohio, has sent us the following receipt for curing the horn-ail in neat cattle. We publish it, though we confess it smacks too much of quackery. It has too many ingredients, a part of which we suspect are at least useless.

"Take three eggs, same in bulk of black pepper, same of soot same of salt, same of hen dung, mix with wheat flour till hard enough for pills; make nine, and give one at a time three successive mornings, and intermit three, and give three again, &c.

ITALIAN SPRING WHEAT.—There has been an abundance of this grain sown. It looks well, and, the grain worm permitting, there will be plenty of seed. Mr. H. Stephenson, who writes from North Lake, Mich., shall be supplied. The price cannot now be determined. We beg Mr. S. not to forget the beautiful prairie flowers, the seeds and bulbs of which he promises to send us. Mr. S. says, that fall wheat in his district, with some exceptions, will be a failure. We coincide with him in opinion, that in many parts of the country our reliance must ultimately be upon spring varieties of this grain.

LIME, we mean the carbonate, whether in the form of powdered lime-stone, effete lime, chalk, marine shells or marl, differs in one particular from the other common earths—clay and sand: it decomposes and disappears in the soil—sand and clay do not. Hence the advantage of re-applying calcareous matters to soils at intervals of a few years—of re-liming, re-marling or re-ashing tillage land.

INDIAN POND SCYTHE STONES are obtaining a decided preference in our market, on account of their superior quality, and are the principal stones now found in our stores. They are obtained at Bradford, Vt, and are manufactured and sold by Filers & Co.

From the Farmers' Register.

REMARKS OF MANURES IN GENERAL—PUTRESCENT, MINERAL, AND MISCELLANEOUS.

We have devoted a large portion of this publication to the subject of manures, both because, in the present state of agriculture, arable land cannot be made to pay the expenses of cultivation without the most skilful and economical, though unsparing, use of the various kinds, and because it is notorious that a great number of farmers are either ignorant of the most judicious mode of their application, or negligent of the means of their increase or preservation. The latter remark applies more especially to farm-yard manure, which no one can ride over any part of the country without seeing wasted—dung carted out of the yards and thrown up by the side of some lane without any foundation or further care, until, perhaps after having become mouldy and firefanged, it is at length turned over, while the best part of its juices have been allowed to run into the ditches, or to stagnate around the heaps—thus, neither assisting the proper fermentation of the dung, nor mixing the heap at such regular periods as to ensure its being all of one quality.‡

We have already stated our opinion so clearly on the subject of fermentation, in our view of putrescent manures, that it may be thought hardly necessary to add any thing to the discussion of the point in dispute; yet, as many farmers have been influenced by the reasonings of chemists, who possess no practical knowledge of agriculture, in favor of the invariable application of long dung—though opposed by experience—and as it is extremely important that the question should be set at rest, we request serious attention to the following extracts from an able article which has appeared in the Quarterly Journal of Agriculture since the publication we have written.§

It was promulgated as the opinion of Sir Humphrey Davy, in 1809, and it has, till lately, obtained the confidence of most chemists, that "*as soon as dung begins to decompose, it throws off its volatile parts, which are the most valuable and most efficient! Dung which has fermented, so as to become a mere soft cohesive mass, has generally lost from one third to one-half of its most useful constituent elements; and that it may exert its full action upon the plant, and lose none of its nutritive powers, it should evidently be applied much sooner, and long before decomposition has arrived at its ultimate result.*" Experience has, nevertheless, acted in direct opposition to this opinion. Manure has been continually applied in "a soft cohesive mass," and it has continued to raise large crops; whereas, had it been applied "long before decomposition had arrived at its ultimate result," that result would probably have been a loss of crop, manure and labor.

It is certainly an erroneous assumption to say the first stage of fermentation in dung must necessarily throw off its most valuable parts. Every dunghill of fresh dung throws off a gaseous exhalation a very short time after it is put together; and a quantity thus thrown off is regulated by the state of the atmosphere. But, this exhalation does not consist of the valuable gases; it is mere evaporation of the water contained in the dung. The same hot haze may be seen flickering over a fallow field in a sunny day in summer. Nobody could with truth assert, that this haze arises from the disengagement of the gases in the dung which had previously been inserted into the soil, when it is clearly nothing more than the evaporation of the moisture in the soil. To say, therefore, the first stage of decomposition in a dunghill throws off "the most valuable and the most efficient" parts of the the dung, is just to say the vapor of water is the most valuable part of dung.

"It is true, were the fermentation continued after all the water in the dung was evaporated, a considerable increase of temperature would ensue; and when the texture of the fibrous portions of the manure began to decompose, there would be an evolution of valuable gases. Direct experiment has proved the escape of gases from a heap of dung which has been long fermenting. But, what harm accrues to the dung as a manure from the escape of these gases? None whatever. We are told these gases constitute the food of plants, and if they are permitted to be dissipated by decomposition, the quantity of nourishment in the heap of manure will of course be so much diminished; that, if the bulk of the dung-heap be diminished one-half or one-third by excessive fermentation, the quantity of nourishment to the crops will be diminished in a greater ratio. These cautions have long been whispered in the ears of practical men, but they have listened to the advice with a provoking indifference. Like ducklings when they first take the water, they have continued to disregard every remonstrance of their foster brethren against injurious practices, raising and devouring their food, and enjoying themselves with the greatest complacency in their vocation. It is true, and we must admit it, that some of the gases constitute the food of the plants, but it does not follow that plants would receive them as food directly, as they are disengaged from a fermenting and heated mass; nay, it is probable they would rather reject the food that would injure them.—But, as plants are not endowed with locomotive powers, they cannot avoid the food which is directly presented to them; they will, therefore, be obliged to partake of it in an injurious state, and in thus taking it they die. Accordingly, we invariably find that plants suffer from the contact of fermenting dung; and it is this well known fact, more than from any other circumstance, which deters farmers from applying dung in an unprepared state. It is sometimes applied to the soil, it is true, in an unprepared state, but long before the crop is brought into contac with it, and after it has undergone fermentation in the soil! Though this application of dung is recommended by men of science, it is performed from the very opposite principle which they recommend. They recommend it because the gases arising, while the dung is fermenting, are absorbed by the soil, and are thence given out for the use of plants; on the other hand, farmers perform it, because the fermentation will have ceased before the crop in inserted into the ground. Which of these is the more rational reason? The practical one, undoubtedly; for it is surely impossible that the slight covering of earth upon the dung can prevent the escape of the elastic gases, however it may retard fermentation.

"Moreover, practice finds that fresh dung is injurious to vegetation, and recent discoveries now inform us that this arises from the acridity of the ammonia, which is always present in unfermented dung. Fermentation drives off the acrid ammonia. Fresh dung is found to injure plants by *burning* them, which is a very appropriate term to describe the action of ammonia. In like manner, stale liquid manure is not so good a top-dressing to grass as fresh, or when it is largely mixed with water; because science now informs us, that ammonia becomes concentrated in stale liquid manure, and is, therefore, in an injurious state for plants; and that it is necessary to mix liquid manures largely with water, in order to dilute the ammonia, and allow the proper action of the humic acid, which exists in large quantity in them. Again, it is not an uncommon practice to cover a dunghill with earth in hot weather; and this is now explained, not as it hitherto has been—"that the earth absorbs and prevents the escape of the carbonic acid gas"—but that a violent fermentation in the dung is checked by the earth, partly excluding the atmospheric air and rain water the oxygen in either of which is indispensable to continue the pro-

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* Singer's Survey of Dumfresshire, p. 311—Gen. Rep. of Scotland, vol. ii. p. 353.

† Young's Survey of Sussex, p. 218.

On this, however, the following remark has been inslerted in the report of the committee of the Doncaster Agricu tural Association upon bone manure—'The general mode of managing fold manure is erroneous, both as to the expense incurred and loss from evaporation. To prevent both, upon carrying it out to the field, it shonld be forked up to a considerable height, and the whole covered with the soil nearest to the heap; a long heap, like a potatoe heap, is therefore best; as it accumulates, taking care always to cover the whole of the day's loading, excepting the end to which the next day's work is to be added. The confinement of the steam, which is always observed upon a fresh made heap of manure, effectually secures the decomposition of the whole; which will cut out like a jelly *without the usual process of turning over and over.*'—p. 31.

‡ No. xxiii. pp. 617 to 624. The discoveries alluded to, relate to a substance which chemists call *Humin*, which is said to exist in all soils, and to be formed of carbon and hydrogen. The *Humic acid* is composed of humin and oxygen, and its properties enable it to combine with lime, potash, amonia, and many substances found in soils and manures, and render them easy to be dissolved in water, which could not be done in their separate state.

cess, it being this oxygen which forms the carbonic acid gas by uniting with the carbon of the dung. The necessity of checking a *violent* fermentation in a dunghill, which contains a large portion of horse-dung, is to prevent it being what is technically called "*fyre fangit*"—a state in which dung is nearly useless.

'We thus see that science now agrees with that practice which has been pursued for years with unexampled success.—It is consolatory to practitioners to think that their experience, though unknowingly to them, has guided them to success on really scientific principles. This agreement of experience and science should teach every one that science and experience, and not science alone, ought to be made the tests to try the accuracy of opinions; but, unfortunately for the credit of sciences, the test of accuracy hitherto, in the application of putrescent manures, has not been submitted to practice.'

We now not only beg to impress upon every farmer the absolute necessity of guarding against the waste of any portion of the farm dung, but also to take care that nothing in the shape of refuse animal or vegetable substance be suffered to be thrown away by his servants. Let a bed of sand, or any earth except clay, be laid in spots adjacent to the offices, and upon it let every particle of offal collected from the premises be regularly thrown; to which add the sweepings of the roads and lanes about the house, grass, turf or rubbish, dug out of drains and ditches; every thing, in short, which, by decomposition, can be converted into manure, and all of which may be got together with very little trouble. Let the whole of this be every now and then covered with the earth, between two layers of which a small quantity of quick-lime may be placed, or sprinkled upon any vegetable substance, such as leaves, tough, haulm fern, or any thing which cannot be easily dissolved, and thus formed into a compost. Care, however, must be taken that the vegetative powers of the roots and plants be completely destroyed before the compost is spread upon the land; for, if unskillfully prepared, they will shoot up in the course of the ensuing season, and overrun the land with weeds. Composts thus formed, whatever may be the ingredients which they contain, will ever be found a most valuable species of manure. The whole substance becomes one uniform mass or nutritive matter, which may be either mixed with the soil, or applied as a top-dressing, and, with proper attention, may be got ready for application at any period of the year. There are numberless receipts scattered throughout the writings of various theorists, in which the quantity and the quality of each ingredient in these various mixtures are as accurately stated as if they were the medical prescriptions of physicians; but these are mere quackeries which do not merit the attention of practical men.

Weeds, also, by the sides of fences, should never be permitted to perfect their seeds, but should be invariably cut while in a state of succulence, and added to the heap; and, if those turned up by the process of horse-hoeing were also raked off, instead of being suffered to wither on the land, or to spring up again with the next shower of rain, it is inconceivable what a large quantity of valuable manure might be raised by the occasional employment of children, and of laborers, who may otherwise be idling away their time. It would also contribute in a great degree to that neatness which forms a distinguished feature in a careful cultivation, and would insure a habit of attention on the part of servants, and a consequent portion of prosperity which can rarely be enjoyed by a slovenly farmer.

Were the *practice of soiling* more generally attented to, it would also materially aid the increase of the dung-heap, without which no profit can be gained from arable land. But a very small portion of the soil under the plough is, in this country, capable of bearing crops, unless it be recruited by putrescent manure about once in four years, or that it be either suffered to e for a more than usual length of time under the cultivatep grasses and fed off with cattle, or supported by the fold. To obtain the requisite quantity of farm-yard manure has, however, baffled the best exertions of many industrious farmers, except in the immediate vicinity of large towns. There, indeed, the object is often obtained through the means of purchased dungs, the expense of which has been generally amply repaid by the growth of proportionally increased crops; but any one who is dependent upon the produce of his own farm, without the substance of extraneous manure, for the support of the fertility of the soil, should endeavor to cultivate those crops which are best calculated to afford a large return of food for the maintenance of cattle. When the land is of such a nature as not to admit the growth of green crops, hay and oil-cake should be resorted to for that purpose.

In other cases, *lime*, *chalk*, *marl*, and various other *mineral substances*, have been resorted to as auxiliaries; but, the effect of some of these tending more to stimulate vegetation than to enrich the wasted powers of the soil, it has frequently happened that ground which at one time had been greatly benefitted by their application, has afterwards been injured when repeated under the erroneous notion that its powers might be restored by the same operation. Land, thus forced, has in many cases been so much impoverished as to render it incapable of producing any thing but a poor pasture, and to require a great length time to pass away before it can be restored to its original condition. It should, indeed, be observed, that the application f fossil manures requires more judgment and consideration than any other; for vegetable and animal manures contain the fertilizing property within themselves, and, however injudiciously applied, cannot fail to impart ultimate benefit to the land, if not the immediate crop; but the power of fossils consists in their action upon the constitution of the soil, and if this be improperly directed, the greatest mischief may ensue.

None of these has, perhaps, produced more injury in some cases, or greater benefit in others, than lime—of which very striking instances may be found in those parts of the country where it is either very abundant or scarce. In the former it has been not uncommonly laid upon the land without the aid of putrescent manure, until the soil has become worthless; while in the latter, as its scarcity renders it expensive, it has only been moderately been used by farmers of judgment and capital, and the effects, after a number of years, are still apparent in the improvement of the soil. While writing this, we have under our eye a farm of 400 acres of strong clay, which has not been limed within the memory of men. The tenant, who is consoious of the advantages which might be derived from the use of lime—as demonstrated in the condition of adjoining land of the same quality—is yet prevented by circumstances from its employment; and thus, not only are his own profits, but the value of the soil to the landlord also, equally reduced.

On the subject of *burnt clay*, we have recently had an opportunity of making some inquries in the neighborhood of the late General Beatson's farm, in Sussex; and we have learned, that although several practical farmers in that part of the country adopted his plan, yet very few of them have found it to answer their expectations. One of them, who has followed it extensively, confirms us in the opinion which we have already stated, that much depends upon the mode in which the operation of burning is performed; for if the clay be calcined to the consistence of brick, it yields nothing in the shape of that soft ash which is proper for manure; and, if not sufficiently burned, it will return to its original condition. In the former state it may, however, act in some degree as an alterative of the soil; and, in the latter, it will at least afford some nutriment to the crop to which it is actually applied. It, therefore, does not appear, from past experience, that it can ever be made to supersede the use of lime on land which has not been formerly dressed with the latter; but, in such cases, or in parts of the country where lime cannot be procured, it may yet be employed to a certain extent with advantage.

As to *paring and burning*, there can be no doubt that the earth, if combined with fibrous roots and other vegetable matter, will answer the purpose of manure when burned: yet shallow soils are thus frequently more injured by the abstraction of too large a portion of the surface, than improved by the temporary addition of the manure. We have lately seen down-land, which was broken up during the war, and has been now during several years returned to pasture, yet still bears nothing like the sward of a fine sheep-walk on the poorest chalks, and probably will require half a century to bring it back to its former condition. We, therefore, cannot but again caution all farmers and owners of land against bringing such soils under the plough.*

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* A treatise has been just published by Professor Rennie, on paring and burning, in which he attributes whatever value it may have to the effects of the fire, considering it "in the light of an

List of Subscribrrs to the Railroad Journal that have paid.—

Mr. Cotton, City New York,	Jan. 1, 1838
F. Argente, do	do
John Stevenson, do	do
do do advertising,	do
C. Loss, Bordentown, N. J.,	do
M. Robinson, Philadelphia, Pa.,	July 1, 1837
C. D. Appleton, Baltimore, Md.,	July 1, 1838
A. Welch, Lambertsville, N. Y.,	Jan. 1, 1838
J. Beasley, Ripley, Ohio,	do
G. B. Slater, Webster, Mass.,	July 1, 1837
H. Sibley, Bucksport, Me.,	Aug. 1, 1837

Advertisements.

It is gratifying to learn that *all* the friends of railroads are not disheartened.—The following notice is cheering to us, may it be so to others.

TO RAILROAD CONTRACTORS.—CENTRAL RAILROAD OF GEORGIA.—Proposals will be received at the office of this Company in Savannah, untill the first day of October next, for grading and preparing for the Superstructure twenty five miles of this road, extending westwardly from a point 26 miles from this city. The distance will be divided into 8 sections and the price per cubic yard for excavation and embankment—per acre for clearing and per 100 feet for grubbing, for each section, offered for, must be stated.

The country through which this part of the road is located is pine barren, and as healthy as any part of the State.

The Company have on hand a large quantity of implements such as barrows, shovels, waggons, carts, &c., which will be furnished at cost and charges, to such contractors as may desire it.

Plans and specifications of the work will be ready for inspection after the first of September, and all necessary information given on application to the subscriber.

L. O. REYNOLDS,
Engineer.

Savannah, Aug. 3rd, 1837. 33—t. 1st Oct.

If any of our citizens, who have encountered and survived he storm, desire a comfortable residence on a productive farm, in a healthy part of the country, we would invite their attention to the advertisement of Mr. John White, in this number. His farms, we have reason to believe, are well worthy of notice.

GREAT BARGAINS.

THE subscriber offers for sale 322 acres of Land, known as the late Cook & Haner Farms, on the beautiful valley, near Manlius Centre, in this county—the limestone creek running through it, on which are three Dwellings, three Barns, good Orchard, 200 acres under good improvement, the stumps out, and well calculated for two farms. The Erie canal in sight, *south* and the *Syracuse and Utica Railroad located and being made* about 20 rods from and parallel with the *north* line, and where is to be the first watering place and station from Syracuse for taking in passengers &c. from Fayetteville, the southern and northern villages, &c. For grain, or grass and grain, for the Sugar or Root business, a better soil cannot be found in any country. When this railroad is completed, fifteen or twenty *minutes* of Syracuse, two hours of Utica, a few hours of all the river cities and New-York; indeed, when the railroad now making from Boston to Albany is completed, within a few hours of all the principal eastern cities. Upon these great thorough fares, and all these advantages, surrounded by flourishing villages, strong competition will always secure on the premises, the highest prices for all its products. This is one of the most splendid farms in the state.

ALSO, for sale 120 acres of Land on the Oswego canal *between* and *immediately* at the junctions of the Seneca and Oneida Rivers, embracing the late widow Eno Plat, Tavern stand, &c. &c. The meeting of these splendid rivers, convenient harbor, the canal—one of the great travelling and commercial thorough fares, to the west, the beauty of the spot, surrounded by a fertile country, indicate this as a favorable spot for a flourishing village, or for a residence, farming, gardening, *profit* and *pleasure*; no situation on the North River can be more desirable—the favorable spot for the stations for all the Packet and Line Boats—for a public house, mercantile establishments, and where every thing raised can be sold at the highest prices.

ALSO, a farm of 160½ acres, bounded on the *west* by the Chittenango river, and on the *north* by the flourishing village of Bridgeport, or "the Rifts," two miles south of the Oneida lake, on the northern and shortest travelled road from Utica to Rochester, cultivated, and the stumps out of nearly a hundred acres, fertile and beautiful land, enough of which may be sold for village lots in a few years to pay for the whole. At the head of navigation, at this village, are quite extensive hydraulic advantages—mills, carding and dressing, tannery, stores, public houses, schools, &c. &c. combining to render this a very desirable farm.

ALSO, a valuable Cedar Lot about two and a half miles north of Chittenango.

ALSO, as Agent some very valuable Farms in Onondaga and Madison counties.

The above mentioned Farms will be sold on highly advantageous terms.

JOHN WHITE.

Syracuse, Onondaga, Co. New-York., June, 1837. 10—m6

CROTON AQUEDUCT—NOTICE.

SEALED PROPOSALS will be received by the Water Commissioners of the city of New-York, until the 5th day of September next, at 9 o'clock, P. M., at their office in the city of New-York, for the Excavation, Embankment, Bank Filling, Foundation and Protection, Walls, Tunnels, several large and small culverts, and an Aqueduct of stone and brick masonry, with other incidental work on that portion of the Croton Aqueduct which is embraced in sections 9—10—12—13—14—16—19 and 21 to 26 inclusive on the 1st Division; and sections 27 to 53 inclusive, being the whole of the 2d Division.

The prices for the work must include the expense of materials necessary for the completion of the same, according to the plans and specifications that will be presented for examination, as hereinafter mentioned.

The work to be completed by the 1st day of October, 1810.

Security will be required for the performance of contracts—and propositions should be accompanied by the names of responsible persons, signifying their assent to become securities. If the character and responsibilities of those proposing, and the sureties they shall offer, are not known to the Commissioners or Engineers, a certificate of good character, and the extent of their responsibility, signed by the first judge or clerk of the county in which they severally reside, will be required.

No transfer of contracts will be recognized

The line of Aqueduct will be located, and the map and profile of the same, together with the plans and specifications of the materials and manner of construction, will be ready for examination at the office of the Engineer, at the village of Tarrytown, on the 19th instant, and the Chief or Resident Engineer will be in attendance to explain the plans, &c., and to furnish blank propositions.

Persons proposing for more work than they wish to contract for, must specify the quantity they desire to take.

The full names of all persons that are parties to any proposition, must be written out in the signature for the same.

The parties to the proposition which may be accepted, will be required to enter into contracts, immediately after the acceptance of the same.

The undersigned reserve to themselves the right to accept or reject proposals that may be offered for the whole or any part of the above described work, as they may consider the public interest to require.

New-York, August 8th, 1837.

STEPHEN ALLEN,
CHARLES DUSENBERRY,
SAUL ALLEY,
WILLIAM W. FOX,
THOMAS T. WOODRUFF,
} Water Commissioners.

JOHN B. JERVIS, Chief Engineer,
New-York Water Works.

3t—32

TO RAILROAD CONTRACTORS.—Proposals will be received at the office of the Clinton and Port Hudson Railroad Company, in the town of Jackson, Louisiana, until the first of November next, for the completion of the balance of the Clinton and Port Hudson Railroad, being about 21 miles. Plans, profiles and specifications, giving all the necessary information, may be examined at the office of the Engineer in the town of Port Hudson.

A. G. THORN,
Chief Engineer.

Port-Hudson, July 13th, 1837. t—32. 1st Nov.

☞ TO RAILROAD COMPANIES.

A PERSON experienced in the construction of Locomotive Engines (many of his Manufacture being in successful operation on important Railroads in the United States) and who is likewise thoroughly acquainted with the management of such machines, and, indeed, the entire ordeal of Railroads, is desirous of obtaining the situation of General Superintendant on some Railroad, South or West.

The most satisfactory testimonials of character and capability can be produced. Communications addressed to the Editors of this Journal, stating the location of Road, &c. will meet with prompt attention.

2t—34

New-York, June 15th, 1837.

THIRD ANNUAL FAIR OF THE MECHANICS' INSTITUTE OF THE CITY OF NEW-YORK.

The *Fair* of the Institute will be held at Niblo's Garden commencing Monday, September 25th, 1837.

To render this exhibition worthy of the arts and of the ingenuity of the Mechanics of our country; the Managers appointed to conduct the approaching *Fair* have determined to make such liberal arrangements as will insure to the contributors a fair opportunity of exhibiting their productions to the greatest advantage.

The object of Exhibition Fairs is to present to the members of the Institute and their fellow citizens who are engaged in the Mechanic Arts, the means of making their skill and ingenuity known in a way no other facilities afford: the many thousands who visit such exhibitions have a much better opportunity of judging of the merits of the various productions, than they would have by a mere verbal or newspaper description, besides the advantage of seeing brought together, in one vast collection, the products of the skill, ingenuity, and industry of our country.

PREMIUMS of Medals, Diplomas, &c. will be awarded for *al* worthy or meritorious articles exhibited, either as it respects superior workmanship, machinery wherein the operations are new, interesting or important, where ingenuity is displayed, or taste manifested, and particularly for all new and useful inventions.

You are respectfully requested to send, for competition or exhibition, specimens of the articles you manufacture; and you may be assured that the strictest impartiality will be observed in the distribution of the Premiums.

Steam power will be provided for the accommodation of those who wish to exhibit Machinery in operation; an experienced Superintendant will take charge of this department, and contributors in this branch are particularly invited to send or bring their Machines or models as early as possible, on the 23d September that the necessary arrangements may be made in relation to shafting, pullies, &c.

The Managers, in conclusion, cannot but express their belief that this Third Fair of the Mechanics' Institute, will exceed in variety and beauty of display, all previous exhibitions of the kind.

GEORGE BRUCE, *Chairm.*
WM. EVERDELL,
C. CROLIUS, JUN.
THOS. EWBANK,
RICHARD BRAGAW,
} *Executive Committee.*

N. B. All articles for competition must be delivered to the Committee at Niblo's Garden, on the 23d September. Those for exhibition *only* will be received any day during the Fair, before 10 o'clock A. M.

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RULES AND REGULATIONS.

1.—The Garden will be opened for the reception of Goods, on Saturday, 23d of September, from 6 o'clock A. M. until 9 o'clock P. M., and it is respectfully urged that all articles intended for competition may be se. t in early in the day. Those articles intended for exhibition *only* will be received any day during the Fair, before the hour of 10 A. M.

2.—The Fair will open for visitors on Monday, 25th Septem- at 10 o'clock A. M., and continue open every day of the exhibition till 10 o'clock P. M.

3.—Competent and impartial Judges will be appointed to examine all articles presented, and premiums will be awarded on all such as shall be declared worthy.

4.—The Committee on Premiums, and all firms or partnerships in which they may be interested, shall be excluded from competition or the award of any premium.

5.—All persons depositing articles, either for competition o exhibition, must attend to have them registered by the Clerk, a which time they will receive a certificate, which will be required of them when the articles are returned.

6.—Proof of origin must be furnished if required, for any specimen offered for Premium.

7.—Depositors will receive a ticket from the Clerk, which will admit them and Ladies during the Exhibition.

8.—Arrangements will be made to exhibit, in operation, all working models that may be deposited—contributions in this branch are invited—a competent person will take charge of all models sent for the above purpose.

9.—The morning of each day, until fifteen minutes before 10 o'clock, shall be appropriated exclusively to the Judges.

10.—Members will receive their tickets of admission by applying at the Institute Rooms, any time in the week previous to and during the exhibition.

11.—All articles offered by Apprentices, will be received, and adjudged as the production of Apprentices—they must furnish a certificate of name, age, with whom, and the time they have served as apprentices.

12.—Articles subject to injury by being handled, should be secured in glass cases—and contributors are requested to have a person to take charge during the hours of exhibition—in the intervals, efficient measures will be taken to protect property.

GENERAL COMMITTEE.

George Bruce,	John Ridley,
John M. Dodd,	Silas B. Simonson,
James J. Mapes,	Thomas F. Peers,
Thomas Ewbank,	Thomas G. Hodgkins,
Wm. Everdell,	George L. Spencer,
C. Crolius, Jr.,	Peter Wemmell,
A. J. Mason,	Richard Bragaw,
Thos. W. Bartholomew,	Ab'm Peitch,
A. Storms,	Wm. H. Hale,
Wm. Ballard,	Wm. J. Mullen,
Henry Cunningham,	James Thomson,
John Harold,	Abner Mills,
Joseph Trench,	L. D. Chapin,
James D. Phyfe,	A. Cammeyer,
John H. Mead,	Hiram Tupper,
John Conroy,	H. B. Robertson,
Jordan L. Mott,	James Thomas,
Samuel Carter,	H. G. Stetson,
George F. Nesbitt,	Ferris Owen,
Henry Worrall,	N. Berry,
W. B. Worrall,	O. Whittelesey,
James B. Cummings,	M. W. Emmons,
James Frost,	J. S. Anderson.

VICKSBURG AND JACKSON RAILROAD.—NOTICE TO CONTRACTORS.—Persons disposed to contract for and give personal attention to the laying of the superstructure for the Vicksburg and Jackson Railroad, about 45 miles in length, in the State of Mississippi, may receive all necessary information to enable them to propose by applying to the subscriber at the office of J. R. Van Rensselaer, Esq., 21 Wall Street, until the first of September next.

R. S. VAN RENSSELAER,
Engineer, V. & J. R.R.

New-York, 1st A 18ugust,37. t—32. 1st

TRANSACTIONS OF THE INSTITUTION OF CIVIL ENGINEERS OF GREAT BRITAIN.

The first volume of this valuable work, has just made its appearance in this country. A few copies, say *twenty-five* or *thirty* only, have been sent out, and those have nearly or quite all been disposed of at *ten dollars* each—a price, although *not* the *value* of the work, yet one, which will prevent many of our young Engineers from possessing it. In order therefore, to place it within their reach, and at a convenient price, we shall *reprint* the entire work, with ll its enagravings, *neatly done* on wood, and issue in six *parts* or *numbers*, of about 48 pages each, which can be sent to any part of the United States by mail, as issued, or put up in a volume at the close.

The price will be to subscribers *three dollars*, or *five dollars* for two copies—*always in advance*. The first number will be ready for delivery early in April—Subscriptions are solicited.

MECHANICS' MAGAZINE AND JOURNAL OF MECHANICS' INSTITUTE,—Published by D. K. Minor, and G. C. Schaeffer, No. 30 Wall-st Basement story, at $3 per annum in advance.

ALSO,—Published at the same place the RAILROAD JOURNAL at $5 a year.

The New-York FARMER and GARDENERS MAGAZINE, at $3 a year. both in advance.

The following notice of T. G. Bates Esq., Canal Commissioner of Ohio, will, we hope, give employment to many who are now seeking work.

From the Dayton (Ohio) Journal, of 29th July.

EXTENSION OF THE MIAMI CANAL.

NOTICE TO CONTRACTORS.

PROPOSALS will be received on the 11th September next, at Sydney, Shelby County, Ohio, for constructing 17 miles of canal, along the valley of the Great Miami, from the mouth of Loramies Creek, to a point 6 miles above Sydney. The work to be contracted for, consists chiefly of an unusual proportion of bluff and steep hill side cutting—much high embankment—several small aqueducts—a number of culverts and 8 or 10 stone locks.

And on the 15th same month, proposals will be received at the town of St. Marys, for constructing about 26 miles of canal along the valleys of Loramies Creek and St Marys river, from a point 3 miles above Piqua to the town of St. Marys. The work on this part of the line, consists of much very heavy excavation and embankment, several small aqueducts and many small culverts. At the same time and place embankments for the great reservoir near St. Marys will also be offered for contract.

The commissioner will expect certificates of character and qualifications from well known or unquestionable authority, to accompany each proposal, unless the bidder is personally known to him or to the Principal or Resident Engineer.

For further particulars, plans, &c., apply to the Engineers on the line of canal or at their offices in Sydney and St Marys.

T. G. BATES.

33—t. 11th. Sep

RAILWAY IRON, LOCOMOTIVES, &c.

THE subscribers offer the following articles for sale:

Railway Iron, flat bars, with countersunk holes and mitred joints,

						lbs.	
350	tons	2½	by	½,	15 ft in length, weighing	4 $\frac{68}{100}$	per ft.
280	"	2	"	½,	" " "	3 $\frac{50}{100}$	"
70	"	1½	"	½,	" " "	2½	"
80	"	1½	"	½,	" " "	1 $\frac{85}{100}$	"
90	"	1	"	½,	" " "	1	"

with Spikes and Splicing Plates adapted thereto. To be sold free of duty to State governments or incorporated companies.

Orders for Pennsylvania Boiler Iron executed.

Rail Road Car and Locomotive Engine Tires, wrought and turned or unturned, ready to be fitted on the wheels, viz. 30, 33, 36, 42, 44, 54, and 60 inches diameter.

E. V. Patent Chain Cable Bolts for Railway Car axles, in lengths of 12 feet 6 inches, to 13 feet 2½, 2½ 3, 3½, 3¾, 3½, and 3¾ inches diameter.

Chains for Inclined Planes, short and stay links, manufactured from the E. V. Cable Bolts, and proved at the greatest strain.

India Rubber Rope for Inclined Planes, made from New Zealand flax.

Also Patent Hemp Cordage for Inclined Planes, and Canal Towing Lines.

Patent Felt for placing between the iron chair and stone block of Edge Railways.

Every description of Railway Iron, as well as Locomotive Engines, imported at the shortest notice, by the agency of one of our partners, who resides in England for this purpose.

A highly respectable American Engineer, resides in England for the purpose of inspecting all Locomotives, Machinery, Railway Iron &c. ordered through us.

A. & G. RALSTON & CO.,
28 tf Philadelphia, No. 4, South Front-st

ARCHIMEDES WORKS.

(100 North Moor street, N. Y.)
NEW-YORK, February 12th, 1836.

THE undersigned begs leave to inform the proprietors of Railroads that they are prepared to furnish all kinds of Machinery for Railroads, Locomotive Engines of any size, Car Wheels, such as are now in successful operation on the Camden and Amboy Railroad, none of which have failed—Castings of all kinds, Wheels, Axles, and Boxes, furnished at shortest notice.

4—tf H. R. DUNHAM & CO.

MACHINE WORKS OF ROGERS KETCHUM AND GROSVENOR, Paterson, New Jersey.

The undersigned receive orders for the following articles, manufactured by them, of the most superior description in every particular. Their works being extensive, and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

RAILROAD WORK.

Locomotive Steam-Engines and Tenders; Driving and other Locomotive Wheels, Axles, Springs and Flange Tires; Car Wheels of cast iron, from a variety of patterns, and Chills; Car Wheels of cast iron, with wrought Tires; Axles of best American refined iron; Springs; Boxes and Bolts for Cars.

COTTON WOOL AND FLAX MACHINERY,

Of all descriptions and of the most improved Patterns, Style, and Workmanship.

Mill Geering and Millwright work generally; Hydraulic and other Presses; Press Screws; Callenders; Lathes and Tools of all kinds; Iron and Brass Castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR
Patterson, New-Jersey, or 60 Wall street, N.
51tf

AMES' CELEBRATED SHOVELS, SPADES, &c.

300 dozens Ames' superior back-strap Shovels
150 do do do plain do
150 do do do caststeel Shovels & Spades
150 do do Gold-mining Shovels
100 do do plated Spades
50 do do socket Shovels and Spades.

Together with Pick Axes, Churn Drills, and Crow Bars (steel pointed,) manufactured from Salisbury refined iron—for sale by the manufacturing agents,

WITHERELL, AMES & CO.
No. 2 Liberty street, New-York.
BACKUS, AMES & CO.
No. 8 State street, Albany

N. B—Also furnished to order, Shapes of every description, made from Salsbury refined Iron v4—tf

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FRAME BRIDGES.

THE undersigned, General Agent of Col. S. H. LONG, to build Bridges, or vend the right to others to build, on his Patent Plan, would respectfully inform Railroad and Bridge Corporations, that he is prepared to make contracts to build, and furnish all materials for superstructures of the kind, in any part of the United States, (Maryland excepted.)

Bridges on the above plan are to be seen at the following localities, viz. On the main road leading from Baltimore to Washington, two miles from the former place. Across the Metawamkeag river on the Military road, in Maine. On the national road in Illinois, at sundry points. On the Baltimore and Susquehanna Railroad at three points. On the Hudson and Patterson Railroad, in two places. On the Boston and Worcester Railroad, at several points. On the Boston and Providence Railroad, at sundry points. Across the Contoocook river at Henniker, N. H. Across the Soubegan river, at Milford, N. H. Across the Connecticut river, at Haverhill, N. H. Across the Contoocook river, at Hancock, N. H. Across the Androscoggin river, at Turner Centre, Maine. Across the Kennebec river, at Waterville, Maine. Across the Genesee river, at Squakiehill, Mount Morris, New-York. Across the White River, at Hartford Vt. Across the Connecticut River, at Lebanon, N. H. Across the mouth of the Broken Straw Creek, Penn. Across the mouth of the Cataraugus Creek, N. Y. A Railroad Bridge diagonally across the Erie, Canal, in the City of Rochester, N. Y. A Railroad Bridge at Upper Still Water, Orono, Maine. This Bridge is 500 feet in length; one of the spans is over 200 feet. It is probably the FIRMEST WOODEN BRIDGE ever built in America.

Notwithstanding his present engagements to build between twenty and thirty Railroad Bridges, and several common bridges, several of which are now in progress of construction, the subscriber will promptly attend to business of the kind to much greater extent and on liberal terms. MOSES LONG.

Rohester, Jan. 12th, 1837. 4—y

STEPHENSON,

Builder of a superior style of Passenger Cars for Railroads.

No. 264 Elizabeth street, near Bleeckerstreet, New-York.

RAILROAD COMPANIES would do well to examine these Cars; a specimen of which may be seen on that part of the New-York and Harlaem Railroad now in operation. 19tf

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PATENT RAILROAD, SHIP AND BOAT SPIKES.

*** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years successful operation, and now almost universal use in the United States, (as well as England, where the subscriber obtained a patent,) are found superior to any ever offered in market.

Railroad Companies may be supplied with Spikes having countersink heads suitable to the holes in iron rails to any amount and on short notice. Almost all the Railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

*** All orders directed to the Agent, Troy, N. Y., will be punctually attended to.

HENRY BURDEN, Agent.
Troy, N. Y., July, 1831.

*** Spikes are kept for sale, at factory prices, by I. & J. Townsend, Albany, and the principal Iron Merchants in Albany and Troy; J. I. Brower, 222 Water street, New-York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

P. S.—Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand for his Spikes. (1J23am) H. BURDEN.

TO RAILROAD CONTRACTORS.

SEALED proposals will be received at the office of the Selma and Tennessee River Railroad Company, in the town of Selma, Alabama, for the graduation of the first forty miles of the Selma and Tennessee Railroad. Proposals for the first six miles from Selma, will be received after the first of May, and acted on by the Board on the 15th May. Proposals for the ensuing 34 miles, will be received after the 10th May, but will not be examined until the 1st of August next, when the work will be ready for contract.

The line, after the first few miles, pursuing the flat of the Mulberry Creek, occupies a region of country, having the repute of being highly healthful. It is free from ponds and swamps, and is well watered.—The soil is generally in cultivation, and is dry, light and sandy, and uncommonly easy of excavation.—The entire length of the line of the Selma and Tennessee Railroads, will be about 170 miles, passing generally through a region as favorable for health as any in the Southern Country.

Owing to the great interest at stake in the success of this enterprise, and the amount of capital already embarked in it, this work must necessarily proceed with vigor, and I invite the attention of men of industry and enterprise, both at the North and elsewhere to this undertaking, as offering in the prospect of continued employment, and the character of the soil and climate, a wide and desirable field to the contractor.

Proposals may be addressed either to the subscriber, or to General Gilbert Shearer, President of the Company.

ANDREW ALFRED DEXTER, Chief Engineer.
Selma, Ala., March 20th, 1837. A 15 tf

ROACH & WARNER,

Manufacturers of OPTICAL, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS, 293 Broadway, New York, will keep constantly on hand a large and general assortment of Instruments in their line.

Wholesale Dealers and Country Merchants supplied with SURVEYING COMPASSES, BAROMETERS, THERMOMETERS, &c. &c. of their own manufacture, warranted accurate, and at lower prices than can be had at any other establishment.

Instruments made to order and repaired. 1y 14

NEW ARRANGEMENT.

ROPES FOR INCLINED PLANES OF RAILROADS.

WE the subscribers having formed a co-partnership under the style and firm of Folger & Coleman, for the manufacturing and selling of Ropes for inclined planes of railroads, and for other uses, offer to supply ropes for inclined planes, of any length required without splice, at short notice, the manufacturing of cordage, heretofore carried on by S. S. Durfee & Co., will be done by the new firm, the same superintendant and machinery are employed by the new firm that were employed by S. S. Durfee & Co. All orders will be promptly attended to, and ropes will be shipped to any port in the United States.

12th month, 12th, 1836. Hudson, Columbia County State of New-York.

ROBT. C. FOLGER,
33—tf. GEORGE COLEMAN.